

Technical Memorandum

**SHAWSHEEN RIVER WATERSHED 2005
DWM WATER QUALITY MONITORING DATA**

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Division of Watershed Management
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Introduction

The Shawsheen River Watershed water quality survey was conducted in 2005, as part of the Division of Watershed Management (DWM) monitoring. Consistent with The DWM's general approach to watershed monitoring to meet defined programmatic objectives, water quality surveys were conducted during the months of May, June, July, August, and September. This technical memorandum is designed to present final DWM-generated water quality monitoring data for use in watershed assessment reports and for reporting data to outside groups.

Project Objectives

The goals of the DWM 2005 Shawsheen River Watershed monitoring were to gather biological, physical and chemical data to assess designated uses, evaluate the impacts of National Pollution Discharge Elimination System (NPDES) discharges and non-point pollution on aquatic health, and to provide quality-assured data for pollution abatement programs. The specific objectives of the 2005 Shawsheen Watershed monitoring were to:

- Provide biological, habitat, and dissolved oxygen, temperature, and chemical data to be used in making *Aquatic Life* and *Aesthetics* use assessments required by Section 305(b) of the Clean Water Act; provide data for other informational needs of Massachusetts regulatory agencies.
- Provide quality-assured fecal coliform and *E. coli* bacteria data for the purpose of assessing *Primary* and *Secondary Contact Recreation* uses.
- Screen fish to provide data to the Massachusetts Department of Public Health (MDPH) for public health risk assessment due to fish tissue contaminants (metals, polychlorinated biphenyls (PCBs) and pesticides). The results of 2005 fish toxics monitoring are detailed in a separate technical memorandum (Maietta *et. al* 2009).
- Collect benthic macroinvertebrate data to assess the *Aquatic Life Use*. The results of the 2005 benthic macroinvertebrate monitoring are detailed in a separate technical memorandum (Johnson and Fiorentino 2011).
- Conduct fish population monitoring to assess the *Aquatic Life Use* and determine the presence, if any, of cold-water fisheries within sampled streams. The results of the 2005 fish population monitoring are detailed in a separate technical memorandum (Maietta 2006).
- Gather stream temperature data to determine whether a cold-water fishery exists in segments sampled.

Sampling Plan

Information pertaining to station location, rationale and objectives is available in *Sampling Plan for Year 2005, Surface Water Monitoring in the Shawsheen River Watershed* (MassDEP undated). For a description of The DWM's general approach to watershed monitoring, see the *MADEP, DWM QAPP for Surface Water Monitoring and Assessment, 2005-2009* (MassDEP 2005a).

Sixteen stations in the Shawsheen River Watershed were selected for monitoring (Table 1, Figure 1). Between May and September 2005 wade-in grab samples were collected monthly (n=5) from sixteen sites. Ten of the sixteen sites were sampled for nutrients (total nitrogen, total phosphorus and ammonia-nitrogen), bacteria (fecal coliform and *E. coli*), turbidity, color (apparent and true) and *in-situ* parameters (DO, percent DO saturation, pH, conductivity, temperature, and total dissolved solids). *In-situ* parameters were measured at the water quality stations using multi-probe units. Six sites were also sampled for hardness.

Five sites were sampled for bacteria only (fecal coliform and *E. coli*) (Table 1). An extra sampling round that collected only bacteria samples was conducted in September at all fifteen bacteria sampling sites. Continuous temperature and dissolved oxygen monitoring with unattended probes was carried out for a minimum duration of 24 hours at 8 sites (Table 1). Continuous temperature monitoring was conducted at three sites to determine whether water quality meets the coldwater criterion (Table 1).

Field and Analytical Methods

Procedures used for water sampling and sample handling are described in the *Sample Collection Techniques for DWM Surface Water Quality Monitoring* (MassDEP 2004a). The Wall Experiment Station (WES) in Lawrence, MA supplied all sample bottles and field preservatives, which were prepared according to the *WES Laboratory Quality Assurance Plan and Standard Operating Procedures* (MassDEP 2001). Procedures for multi-probe calibration and deployment are described in *Water Quality Multi-probe Instrument Use* (MassDEP 2004b) and *Multi-probe Deployments for Unattended Logging* (MassDEP 2004c). Continuous temperature monitoring was conducted at three sites according to *Standard Operating Procedures: Continuous Temperature Monitoring* (MassDEP 2005b).

Wade-in grab samples were collected and sent to the WES where they were analyzed for nutrients (total nitrogen, ammonia-nitrogen and total phosphorus), hardness, *E. coli* bacteria and fecal coliform bacteria. Grab samples were analyzed for color and turbidity at the DWM's Worcester office. *In-situ* parameters such as dissolved oxygen, percent saturation, pH, conductivity, temperature, and total dissolved solids were measured using a multi-probe.

Concurrent with the collection of water quality samples, site characteristics and sampling conditions were recorded on the DWM field sheets. Riparian vegetation, observed uses, potential pollution sources, the presence/absence of objectionable deposits (trash, debris and scum), the extent of periphyton/algae/aquatic plant growth within the sampling reach, and sampling conditions were all noted at each station.

Quality Assurance and Quality Control

Procedures used were consistent with the prevailing DWM sampling protocols that are described in the *Sample Collection Techniques for DWM Surface Water Quality Monitoring* (MA DEP 2004a). For all water quality surveys, quality control samples (field blanks and duplicates) were taken at a minimum of one each per analyte per crew per survey.

DWM quality assurance and database management staff reviewed lab data reports and all multi-probe data. The data were validated and finalized per appropriate data validation procedures as outlined in *DWM Water Quality Data Validation Process (Summary)* (MassDEP 2012a). Detailed data validation procedures for laboratory data, attended multi-probe data and unattended multi-probe data were conducted using appropriate procedures (MassDEP 2012b, MassDEP 2012c, MassDEP 2012d). A complete summary of the review process for all 2005 DWM data is provided

in the *DWM Data Validation Report for Year 2005 Project Data* (MassDEP 2007). Appendix 1 of this technical memorandum contains definitions for all data qualifiers.

Table 1. Sampling sites, descriptions and parameters for Shawsheen River Watershed monitoring

Unique ID	Station ID	Waterbody	Station Description	Latitude	Longitude	Nutrients ¹	Fecal Coliform and <i>E. coli</i> Bacteria	Hardness	Color (True and Apparent)	Turbidity	Attended multi-probe	Deployed multi-probe	Temperature
W0093	SH01	Shawsheen River	[Summer Street, Bedford]	42.473716	-71.263893	X	X	X	X	X	X	X	
W0099	EB02	Elm Brook	[Great Road (Routes 4 & 225), Bedford]	42.487027	-71.264004	X	X	X	X	X	X	X	X
W0091	SH06	Shawsheen River	[Route 3A, Billerica]	42.534419	-71.233573	X	X	X	X	X	X	X	
W0357	VB02A	Vine Brook	[Terrace Hall Avenue, Burlington]	42.496453	-71.224266	X	X		X	X	X	X	
W1390	LMB00	Long Meadow Brook	[South Bedford Street, Burlington]	42.489785	-71.20829		X						
W1391	SB00	Sandy Brook	[Sandy Brook Road, Burlington]	42.497427	-71.212542		X						
W0185	SH03	Spring Brook	[Route 62, Bedford]	42.494808	-71.257876		X						
W0089	SH07	Shawsheen River	[At USGS gage no. 01100600 near Route 129, Billerica/Wilmington]	42.568154	-71.215175		X						
W1392	SR01	Shawsheen River	[Mill Street, Tewksbury]	42.599663	-71.193061	X	X	X	X	X	X	X	
W0750	CB01	Content Brook	[Beech Street, Tewksbury]	42.579671	-71.218217	X	X	X	X	X	X		
W0097	SW01	Strong Water Brook	[Shawsheen Street, Tewksbury]	42.595773	-71.196084	X	X		X	X	X	X	
W1393	PB00	Unnamed Tributary (Pinnacle Brook)	[unnamed tributary to Meadow Brook locally known as Pinnacle Brook, Pinnacle Street, Tewksbury]	42.628878	-71.1994	X	X		X	X	X		
W0086	SH09	Shawsheen River	[Central Street, Andover]	42.647446	-71.150803	X	X	X	X	X	X	X	
W0082	SH11A	Shawsheen River	[Loring Street, Lawrence]	42.698973	-71.144786		X						

1- TN, NH3-N, TP

Table 1 (continued). Sampling sites, descriptions, parameters and frequency for Shawsheen River Watershed monitoring

Unique ID	Station ID	Waterbody	Station Description	Latitude	Longitude	Nutrients ¹	Fecal Coliform and <i>E. coli</i> Bacteria	Hardness	Color (True and Apparent)	Turbidity	Attended multi-probe	Deployed Multi-probe	Temperature
W0989	RB01A	Rogers Brook	[approximately 550 feet upstream of confluence with Shawsheen River, Andover]	42.65395	-71.14749	X	X		X	X	X	X	X
W0096	RB02	Rogers Brook	[Chestnut Court, Andover]	42.65581	-71.133384								X

1- TN, NH3-N, TP

DWM 2005 Water Quality Sampling Locations in the Shawsheen River Watershed

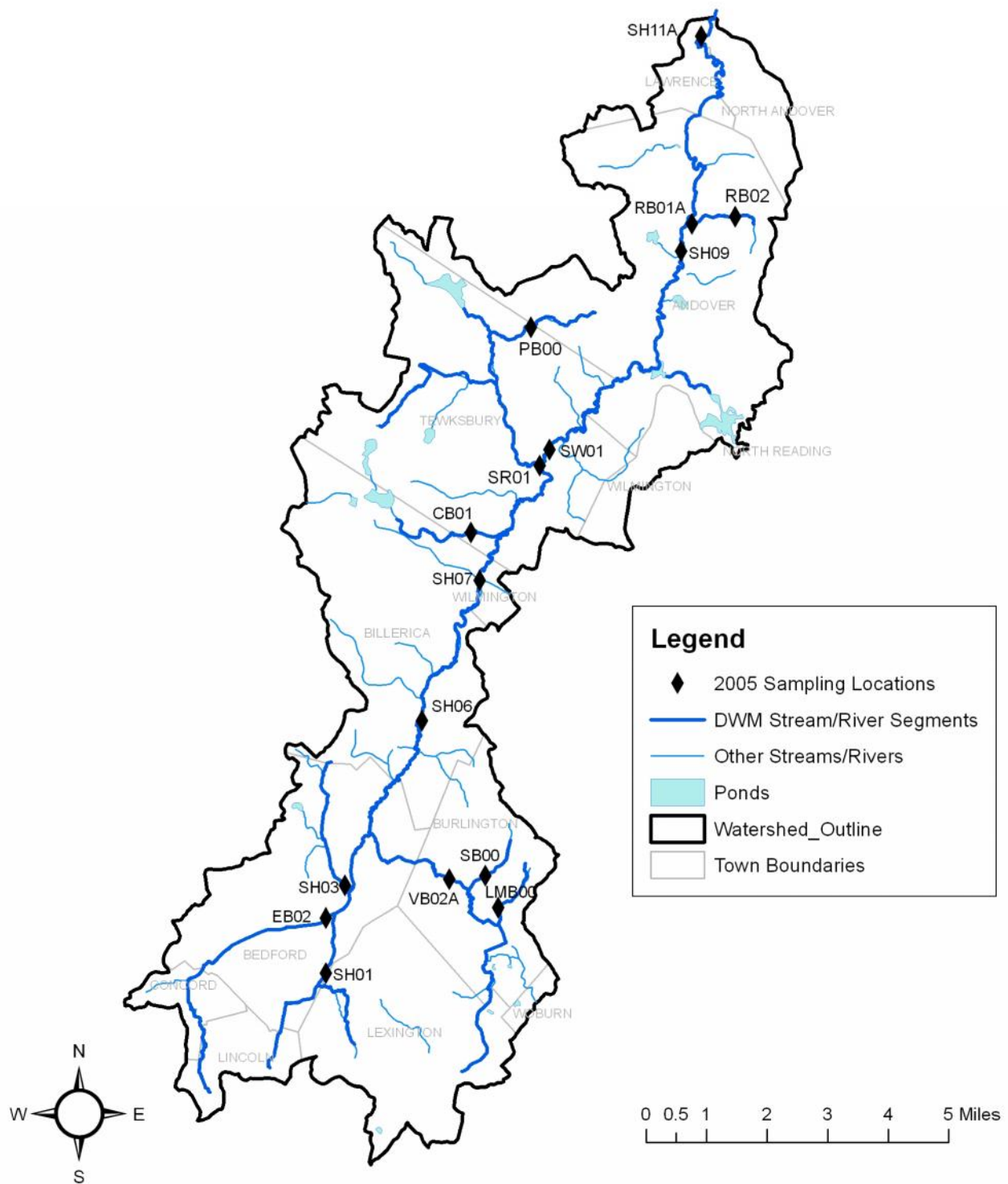


Figure 1: MassDEP DWM 2005 water quality monitoring locations in the Shawsheen River Watershed

Station Observations

Station observations were recorded on field sheets for each survey by a DWM investigator. Station observations are described below in Table 2 for each DWM water quality sampling event (MassDEP 2012e). Note: If multiple types of periphyton were observed, the highest observed density is used in this table. If density information was left blank but periphyton was noted, it was assumed that density was sparse. For stations that had both water quality sampling and probe deploy field sheets only field observations from water quality sampling field sheets is included. Blank cells indicate that no such field was present on the field sheet for use during sampling.

Table 2. 2005 Field observations from MassDEP DWM water quality surveys

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH01	5/24/2005	None	Slightly Turbid	None	None	No	No	
SH01	6/21/2005	None	Clear	Sparse	None	No	No	Plants: Grasses
SH01	7/26/2005	None	Clear	Moderate	None	No	No	Plants: Grasses
SH01	8/23/2005	Musty (Basement)	Clear	Moderate	None	No	Yes	Plants: Grasses, small viney plant
SH01	9/7/2005	None	Moderately Turbid	Not Recorded	Not Recorded	No	No	
SH01	9/28/2005	None	Slightly Turbid	Sparse	Sparse	No	No	Plants: Grasses

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
EB02	5/24/2005	None	Unobservable	None	None	No	No	
EB02	6/21/2005	Other (pesticide)	Slightly Turbid	None	None	Yes	Yes	Obj. Deposits: Trash
EB02	7/26/2005	None	Clear	None	None	No	Yes	Obj. Deposits: Trash
EB02	8/23/2005	Musty (Basement)	Slightly Turbid	None	None	No	Yes	Obj. Deposits: Trash(shopping cart, Dunkin Donuts litter)
EB02	9/7/2005	None	Moderately Turbid	None	Sparse	No	No	Periphyton: Filamentous on bottom.
EB02	9/28/2005	None	Slightly Turbid	Sparse	None	No	Yes	Obj. Deposits: Trash (sides of stream, especially right bank)

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH06	5/24/2005	None	Slightly Turbid	Unobservable	Unobservable	No	Yes	Obj. Deposits: Trash (one long (~12 ') metal pipe), knotweed.
SH06	6/21/2005	None	Highly Turbid	Sparse	Unobservable	No	No	Plants: grasses.
SH06	7/26/2005	None	Slightly Turbid	Moderate	Moderate	No	No	Plants: grasses. Periphyton: Loose flocs on rocks, Moss
SH06	8/23/2005	Musty (Basement)	Slightly Turbid	Sparse	Sparse	No	No	Plants: grasses, lillies. Periphyton: Brown loose flocs on rocks, bottom.
SH06	9/7/2005	None	Clear	Not Recorded	Not Recorded	No	No	
SH06	9/28/2005	None	Slightly Turbid	Sparse	None	No	No	

Table 2 (continued). 2005 Field observations from MA DEP DWM water quality surveys (MassDEP 2012e).

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
VB02A	5/24/2005	None	Clear	Moderate	Moderate	No	No	Periphyton: Green filamentous on rocks in pool.
VB02A	6/21/2005	None	Clear	Dense	None	No	No	
VB02A	7/26/2005	Raw sewage	Highly Turbid	Dense	Dense	Yes	Yes	Periphyton: Film, Loose floc. Obj. Deposits: flocculant mass, site appears backed up, flow higher, little flow, very slow, scum extensive, sewage odor from CSO plant.
VB02A	8/23/2005	Musty (Basement)	Moderately Turbid	Not Recorded	Sparse	Yes	No	Periphyton: Film in pool.
VB02A	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	Flow status: no flow, looks like beaver dam blocking flow, flow status: pooled.
VB02A	9/28/2005	None	Slightly Turbid	Moderate	Unobservable	Yes	No	Flow status: pooled (with note "very slight flow").

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
LMB00	5/24/2005	None	Highly Turbid	None	None	No	No	
LMB00	6/21/2005	None	Clear	Sparse	None	No	No	Plants: Water lillies.
LMB00	7/26/2005	None	Clear	Sparse	None	No	No	Plants: little plants, grasses.
LMB00	8/23/2005	None	Clear	Sparse	Sparse	No	No	Plants: grasses. Periphyton: Filamentous.
LMB00	9/7/2005	Not Recorded	Not Recorded	Not Recorded	Not Recorded	Not Recorded	Not Recorded	Flow status: no water, no flow.
LMB00	9/28/2005	Not Recorded	Not Recorded	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Flow status: no flow/water in brook.

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SB00	5/24/2005	None	Moderately Turbid	Moderate	None	No	No	Plants: waterwort.
SB00	6/21/2005	None	Clear	Very Dense	None	No	No	Plants: duckweed, grasses, unknown.
SB00	7/26/2005	Raw sewage	Clear	Dense	Moderate	Yes	Unobservable	Plants: grasses, sedges, milfoil. Periphyton: Filamentous and Film on bottom. Other: water looks impaired from nutrient.
SB00	8/23/2005	None	Clear	Moderate	Sparse	No	No	Plants: grasses, sedges, cattails. Periphyton: Moss, Filamentous and Film on plants and bottom.
SB00	9/7/2005	None	Clear	Not Recorded	Not Recorded	No	No	Flow: pooled.
SB00	9/28/2005	None	Clear	Moderate	Sparse	Yes	No	Plants: grasses, sedges. Periphyton: Filamentous on rocks and Plants.

Table 2 (continued). 2005 Field observations from MA DEP DWM water quality surveys (MassDEP 2012e).

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH03	5/24/2005	None	Clear	Moderate	Sparse	No	No	Plants: sedges, grasses. Periphyton: Green Filamentous on rocks.
SH03	6/21/2005	None	Clear	Dense	None	No	No	Plants: grasses, moss.
SH03	7/26/2005	None	Clear	Dense	Dense	No	No	Plants: grasses, sedges. Periphyton: Moss, Moderate Loose floc
SH03	8/23/2005	None	Clear	Very Dense	Unobservable	No	No	Plants: emergent and submerged.
SH03	9/7/2005	None	Clear	Not Recorded	Not Recorded	No	No	Flow status: little flow.
SH03	9/28/2005	None	Clear	Dense	Unobservable	No	No	Plants: grasses. Flow status: barely flowing, tough to get sample, not much flow.

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH07	5/24/2005	None	Clear	None	None	No	No	
SH07	6/21/2005	None	Moderately Turbid	Sparse	None	No	No	Plants: grasses.
SH07	7/26/2005	None	Clear	Moderate	Moderate	No	No	Plants: emergent and submergent grasses. Periphyton: Moss, Filamentous and Film on rocks.
SH07	8/23/2005	None	Clear	Moderate	Moderate	No	No	Plants: grasses and sedges. Periphyton: Filamentous, Film and Loose floc on rocks and bottom.
SH07	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
SH07	9/28/2005	Fishy	Slightly Turbid	Sparse	None	Yes	No	

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SR01	5/24/2005	None	Slightly Turbid	Unobservable	Unobservable	No	No	
SR01	6/21/2005	None	Highly Turbid	Sparse	None	No	No	Plants: grasses.
SR01	7/26/2005	None	Slightly Turbid	Sparse	Sparse	No	No	Plants: submerged grasses. Periphyton: Film and loose floc on rocks.
SR01	8/23/2005	None	Clear	Sparse	Dense	No	Not Recorded	Plants: grasses. Periphyton: Moss on rocks, Filamentous on rocks in pool.
SR01	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
SR01	9/28/2005	None	Slightly Turbid	Sparse	Moderate	No	No	Periphyton: Filamentous on rocks and bottom.

Table 2 (continued). 2005 Field observations from MA DEP DWM water quality surveys (MassDEP 2012e).

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
CB01	5/24/2005	None	Clear	Moderate	Sparse	No	No	Plants: duckweed, sedges. Periphyton: Filamentous on rocks in run.
CB01	6/21/2005	None	Moderately Turbid	Dense	None	No	No	Plants: grass
CB01	7/26/2005	None	Moderately Turbid	Dense	Moderate	No	No	Plants: grasses. Periphyton: Moss, Loose floc on rocks.
CB01	8/23/2005	None	Clear	Dense	Dense	No	No	Plants: emergent grasses. Periphyton: Moss.
CB01	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
CB01	9/28/2005	None	Slightly Turbid	Moderate	Moderate	No	Yes	Plants: emergent grasses. Periphyton: Filamentous on plants and rocks. Obj. Deposits: Trash (broken glass).

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SW01	5/24/2005	None	Clear	None	Moderate	No	No	Periphyton: Black film on rocks in riffle. Other: sewerage Mohawk Drive, road torn up, heavy machinery
SW01	6/21/2005	None	Clear	None	None	No	No	
SW01	7/26/2005	None	Clear	Moderate	Moderate	No	No	Moss on rocks.
SW01	8/23/2005	None	Clear	Moderate	Sparse	No	No	Plants: grasses, sedge, purple loosestrife, touch-me-not. Periphyton: Black filamentous on rocks.
SW01	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
SW01	9/28/2005	None	Clear	Moderate	Sparse	No	Yes	Plants: grasses and sedges. Periphyton: Filamentous on rocks and woody debris, Moss. Obj. Deposits: Trash (some wood debris/building materials)

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
PB00	5/24/2005	None	Slightly Turbid	None	None	No	No	
PB00	6/21/2005	None	Clear	None	None	No	No	
PB00	7/26/2005	None	Clear	Sparse	Moderate	No	No	Plants: shoreline grasses. Periphyton: Moss. Other: just downstream from a composting farm (former piggery)
PB00	8/23/2005	None	Clear	Very Dense	Sparse	No	No	Plants: grasses, purple loosestrife, touch-me-not. Periphyton: Black filamentous on rocks.
PB00	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
PB00	9/28/2005	None	Slightly Turbid	Sparse	Moderate	Yes	No	Periphyton: Filamentous on rocks, bottom and plants, Moss.

Table 2 (continued). 2005 Field observations from MA DEP DWM water quality surveys (MassDEP 2012e).

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH09	5/24/2005	None	Slightly Turbid	Sparse	None	No	No	Plants: grass.
SH09	6/21/2005	None	Moderately Turbid	Dense	Sparse	No	No	Plants: grasses. Green filamentous on rocks in run.
SH09	7/26/2005	None	Slightly Turbid	Moderate	Moderate	No	No	Plants: grass. Periphyton: Filamentous on rocks, Moss.
SH09	8/23/2005	None	Clear	Moderate	Sparse	No	No	Plants: grasses, sedges, growth on rocks. Periphyton: Green filamentous on rocks.
SH09	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
SH09	9/28/2005	None	Clear	Moderate	Sparse	Yes	No	Plants: grasses, water lillies, milfoil. Periphyton: Filamentous on rocks and plants, Loose floc on rocks and plants.

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
SH11A	5/24/2005	None	Clear	None	None	No	No	
SH11A	6/21/2005	None	Moderately Turbid	Unobservable	Unobservable	Yes	No	
SH11A	7/26/2005	None	Slightly Turbid	Sparse	Moderate	No	No	Periphyton: Filamentous on rocks.
SH11A	8/23/2005	None	Slightly Turbid	None	Moderate	No	No	Periphyton: Filamentous, Film, and Loose Floc on rocks and on bottom, Moss.
SH11A	9/7/2005	None	Slightly Turbid	Not Recorded	Not Recorded	No	No	
SH11A	9/28/2005	None	Slightly Turbid	None	Unobservable	No	Yes	Obj. Deposits trash and garbage smell on left side near where we parked.

Site	Date	Odor	Water Clarity	Aquatic Plants	Periphyton	Floating Scum	Obj. Deposits	Comments
RB01A	5/24/2005	None	Clear	None	Moderate	No	No	Periphyton: Green filamentous on rocks, Moss.
RB01A	6/21/2005	None	Clear	None	None	No	Yes	Obj. Deposits: Trash
RB01A	7/26/2005	None	Clear	None	Moderate	No	Yes	Periphyton: Filamentous on rocks, Moss. Obj. Deposits: Trash
RB01A	8/23/2005	Musty (Basement)	Clear	Sparse	Moderate	No	Yes	Plants: moss on rocks. Periphyton: Moss.
RB01A	9/7/2005	None	Clear	Not Recorded	Not Recorded	No	Yes	Obj. Deposits: Trash
RB01A	9/28/2005	None	Clear	None	None	No	Yes	Obj. Deposits: Trash (instream plastic bags, other debris)

Survey Conditions

Precipitation and stream discharge data were analyzed to estimate hydrological conditions during water quality surveys in the Shawsheen River Watershed. Precipitation data collected during the survey period in 2005 were downloaded from the National Oceanic and Atmospheric Administration (NOAA), National Climatic Data Center (NCDC) for the Laurence G. Hanscom Fld APT and Lawrence Municipal Airport weather stations (NOAA 2012). The precipitation totals on the water quality survey dates and the five days prior to the survey dates were extracted from NCDC data.

There are two United States Geological Survey (USGS) stream gages located in the Shawsheen River Watershed. The Shawsheen River at Hanscom Field stream gage (#01100568) is situated 300 feet downstream of the Federal Aviation Administration (FAA) hangar at the United States Air Force Hanscom Field. The drainage area for this gage is 2.13 square miles. The discharge values for this gage have been noted to be highly provisional (USGS 2008a). The Shawsheen River gage (#01100600) near Wilmington, MA is located on the right bank downstream from the bridge on State Highway 129, 1 mile upstream from Content Brook. The drainage area for this gage is 36.5 square miles. The USGS notes that there is occasional diversion upstream each year for municipal water supply (USGS 2008b). The 7Q10 value for this gage is 2.306 cfs (Ries 1998).

Stream discharge data from the Shawsheen River near Wilimington, MA stream gage (#01100600) was downloaded from the USGS (USGS 2012a). The average daily discharge values on survey dates and the five days prior to survey dates for both grab water quality sampling dates and unattended multi-probe deployment dates were extracted from the period of record streamflow data. The percent of time that the average daily discharge for dates of interest was equaled or exceeded during the entire period of record for the gage was calculated to put the discharge values into perspective.

Precipitation and stream discharge data were reviewed for a minimum of five days leading up to each sampling date in an effort to determine whether survey conditions were more representative of dry or wet-weather conditions (Table 3, Figures 2-7). A sample was considered to have been collected during dry weather when there was no precipitation (<0.1 inch) on the sampling day and three days prior. It is the practice of the DWM to define a "wet weather" sample as one that was collected at a location that received at least 0.5 inches of rainfall within the 72 hours antecedent to sample collection. Given limited resources, sampling the first flush (first hour of a rain event forecast to produce 0.25 inches of precipitation) was not possible. The USGS reports that streamflows were above historical means in April, May and July and below historical means in June, August and September 2005 (USGS 2008c).

24 May 2005: Sampling crews reported rain with temperatures between 40 and 50°F. On the day of sampling 1.30 inches of rain fell at the Lawrence Airport while one day prior to sampling 0.44 inches of rain was recorded (Table 3). Streamflows in the Shawsheen River near Wilmington (Gage #01100600) increased from one day before and during sampling (Table 4 and Figure 2). Due to the rainfall before and during this survey it will be interpreted as being representative of **wet weather conditions**.

21 June 2005: Field crews noted mostly sunny conditions and air temperatures were estimated to be between 80-90 °F. Only 0.01 inches of rainfall were recorded at the Lawrence airport in the three days before sampling while 0.40 and 0.1 inches were recorded on the fourth and fifth day before sampling (Table 3). Streamflows in the Shawsheen River near Wilmington (Gage #01100600) were generally decreasing between three days before sampling and the sampling date. Flow on the sampling date was approximately ten times greater than 7Q10 and forty percent lower than the period-of-record mean discharge for June (Table 4 and Figure 3). Samples collected on 21 June were considered representative of **dry weather conditions**.

26 July 2005: Field crews noted clear conditions and air temperatures were estimated to be between 80-90 °F. Only a trace amount of rain was recorded at the Lawrence airport in the five days before sampling (Table 3). Streamflows in the Shawsheen River near Wilmington (Gage #01100600) were decreasing in the days before sampling (Figure 4). Streamflows were greater than the 7Q10 flow but flows were approximately forty percent of the period-of-record mean discharge for July (Table 4 and Figure 4). Samples collected on this date will be interpreted as being representative of **dry weather conditions**.

23 August 2005: Field crews generally noted mostly sunny or clear skies and estimated air temperatures between 70-80 °F. Only 0.03 inches of rain were recorded at the Lawrence airport in the five days before the sampling date (Table 3). Streamflows in the Shawsheen River near Wilmington (Gage #01100600) were decreasing in the five days before sampling. Streamflows were greater than the 7Q10 flow but flows were approximately one third of the period-of-record mean discharge for August (Table 4 and Figure 5). Data from samples collected on the 23rd will be interpreted as being indicative of **dry weather conditions**.

7 September 2005: Field crews generally noted mostly sunny or clear skies and estimated air temperatures between 70-80 °F. Only 0.01 inches of rain were recorded at the Lawrence airport in the five days before and including the sampling date (Table 3). Mean daily discharge in the Shawsheen River near Wilmington (Gage #01100600) ranged between 1.4 (the lowest daily mean for water year 2005) and 5.4 cubic feet per second (cfs) in the five days before sampling and was 4.8 cfs on the sampling date (Table 4). Mean daily discharge was approximately one-fourth of the period-of-record mean discharge for September (Table 4 and Figure 6). Samples collected on this date are considered representative of **dry weather conditions**.

28 September 2005: Field crews noted clear skies and estimated air temperatures between 60-70 °F. Only 0.10 inches of rain were recorded at the Lawrence airport in the five days before the sampling date (Table 3). Mean daily discharge in the Shawsheen River near Wilmington (Gage #01100600) was consistently around 5 cfs (Table 4 and Figure 7). Mean daily discharge was approximately one-fourth of the period-of-record mean discharge for September (Table 4). Samples collected on this date are considered representative of **dry weather conditions**.

Table 3. Precipitation and discharge - The precipitation totals (inches) and daily average discharge (cubic feet per second) with percent exceeded on the water quality survey dates and the five days prior to the survey dates. Percent exceeded is the percent of time that the discharge was equaled or exceeded during the period of record for the stream gage. Shaded dates indicate the deployment of multi-probes and large bold dates indicate collection of water samples (USGS 2012a) (NOAA 2012).

Date	Precipitation (in)		Discharge (cfs)	Discharge (% exceeded)
	Hanscom	Lawrence	Shawsheen River near Wilmington, MA Provisional 7Q10 = 2.306 cfs (Ries 1998)	
5/08/2005	0.02	0.06	80	24%
5/09/2005	0	T	100	17%
5/10/2005	0	0	85	22%
5/11/2005	0	0	72	28%
5/12/2005	0	0	60	35%
5/13/2005	0	0	52	40%
5/14/2005	0	T	45	46%
5/15/2005	0.07	0.05	43	47%
5/16/2005	0.1	0.15	44	46%
5/19/2005	0.02	0.01	53	39%
5/20/2005	0	0	58	36%
5/21/2005	0.26	0.44	56	37%
5/22/2005	0.15	0.64	59	35%
5/23/2005	0.31	0.44	58	36%
5/24/2005	0.92	1.3	69	29%
6/12/2005	0	0.02	55	38%
6/13/2005	0	0.01	43	47%
6/14/2005	0.07	0.11	36	54%
6/15/2005	0.02	0.09	29	61%
6/16/2005	0.13	0.4	28	63%
6/17/2005	0.07	0.1	29	61%
6/18/2005	T	0	30	60%
6/19/2005	0	0	30	60%
6/20/2005	0.01	0.01	27	64%
6/21/2005	0	0	24	67%
7/17/2005	0	0	20	72%
7/18/2005	0	0.01	19	73%
7/19/2005	T	0.05	18	74%
7/20/2005	0	0	17	76%
7/21/2005	0.01	0	16	77%
7/22/2005	0	T	15	79%
7/23/2005	0	0	13	82%
7/24/2005	0	0	12	84%
7/25/2005	0	0	11	85%
7/26/2005	0	0	10	86%
8/14/2005	0.88	0.27	7.2	92%

T- trace amount of precipitation noted

Table 3 (continued). The precipitation totals (inches) and daily average discharge (cubic feet per second) with percent exceeded on the water quality survey dates and the five days prior to the survey dates. Percent exceeded is the percent of time that the discharge was equaled or exceeded during the period of record for the stream gage. Shaded dates indicate the deployment of multi-probes and large bold dates indicate collection of water samples (USGS 2012A) (NOAA 2012).

	Precipitation(in)		Discharge (cfs)	Discharge (% exceeded)
Date	Hanscom	Lawrence	Shawsheen River near Wilmington, MA Provisional 7Q10 = 2.306 cfs (Ries 1998)	
8/15/2005	0.09	0.59	11	85%
8/16/2005	0	0	20	72%
8/17/2005	0.01	0.01	17	76%
8/18/2005	0	0	13	82%
8/19/2005	0	0	9.9	86%
8/20/2005	0	0	8.2	90%
8/21/2005	0.13	0.03	7.3	91%
8/22/2005	0	0	6.8	92%
8/23/2005	0	0	6.4	93%
9/02/2005	0	0	5.4	95%
9/03/2005	0	0	2.6	99%
9/04/2005	0.02	T	1.4	100%
9/05/2005	0	T	2.2	99%
9/06/2005	0.01	0	5.1	95%
9/07/2005	0	0.01	4.8	96%
9/11/2005	0	0	3.6	98%
9/12/2005	0	0	3.5	98%
9/13/2005	0.01	0	3.4	98%
9/14/2005	T	0	3.4	98%
9/15/2005	0.65	0.26	4	97%
9/16/2005	0.1	0.09	9.3	87%
9/17/2005	0.08	0.28	5.1	95%
9/18/2005	T	T	2.2	99%
9/19/2005	0.01	0	1.9	100%
9/23/2005	T	T	4.4	97%
9/24/2005	0	0	4.1	97%
9/25/2005	0	0	3.8	98%
9/26/2005	0.15	0.1	3.9	97%
9/27/2005	0	0	4.2	97%
9/28/2005	0	0	4.5	96%

T- trace amount of precipitation noted

Table 4. USGS gage data summary for the 2005 MassDEP DWM Shawsheen River Watershed surveys (USGS 2012a, USGS 2012b).

Shawsheen River Watershed Surveys USGS Discharge Data Summary (reported in cfs)								
Survey Dates	5 Days Prior	4 Days Prior	3 Days Prior	2 Days Prior	1 Day Prior	Sample Date	Monthly Mean	POR* Monthly Mean
<u>Shawsheen River near Wilmington, MA.</u> (Provisional 7Q10 = 2.306 cfs, Ries 1998)								
Gage #01100600								
5/24/2005	53	58	56	59	58	69	91.5	64.3
6/21/2005	28	29	30	30	27	24	38.6	49.6
7/26/2005	16	15	13	12	11	10	29.1	24.9
8/23/2005	13	9.9	8.2	7.3	6.8	6.4	13.8	23.1
9/7/2005	5.4	2.6	1.4	2.2	5.1	4.8	5.42	21.4
9/28/2005	4.4	4.1	3.8	3.9	4.2	4.5	5.42	21.4

* Period of Record

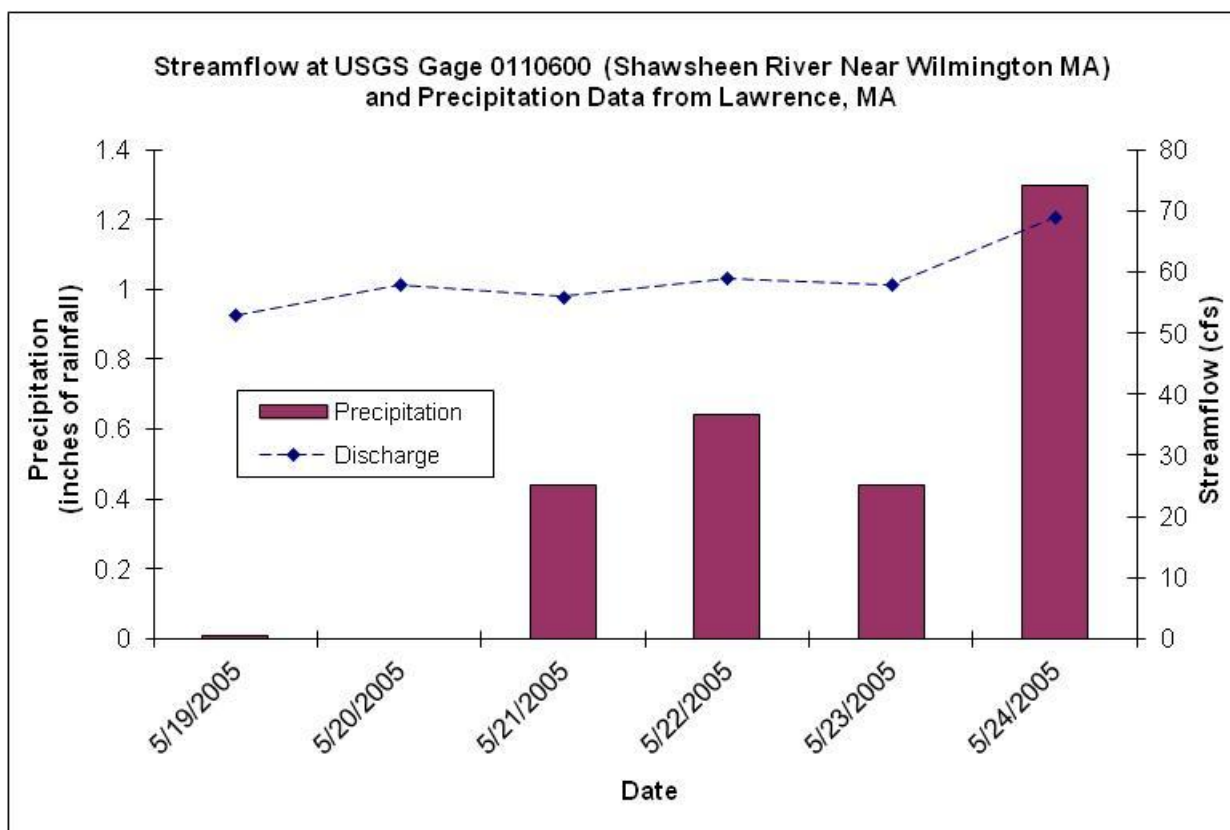


Figure 2: May 2005 flow versus precipitation for the Shawsheen River Watershed

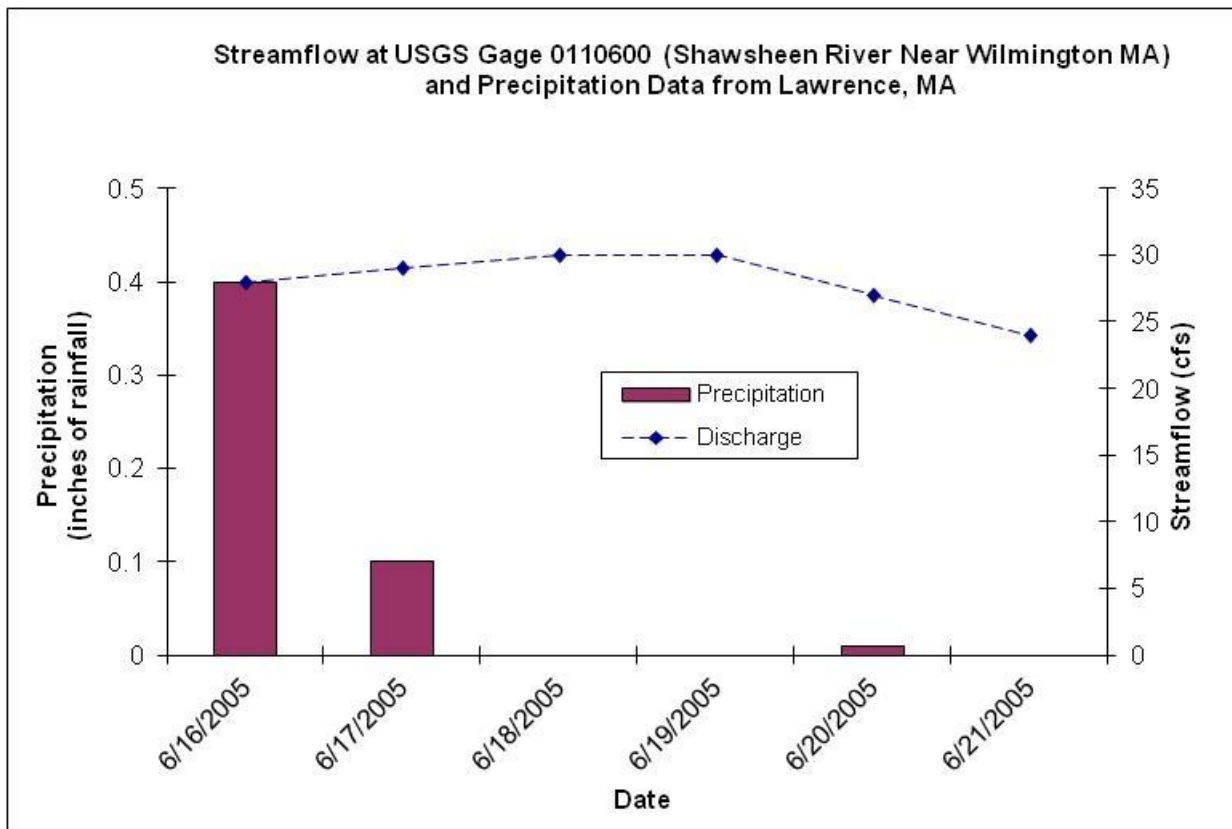


Figure 3: June 2005 flow versus precipitation for the Shawsheen River Watershed

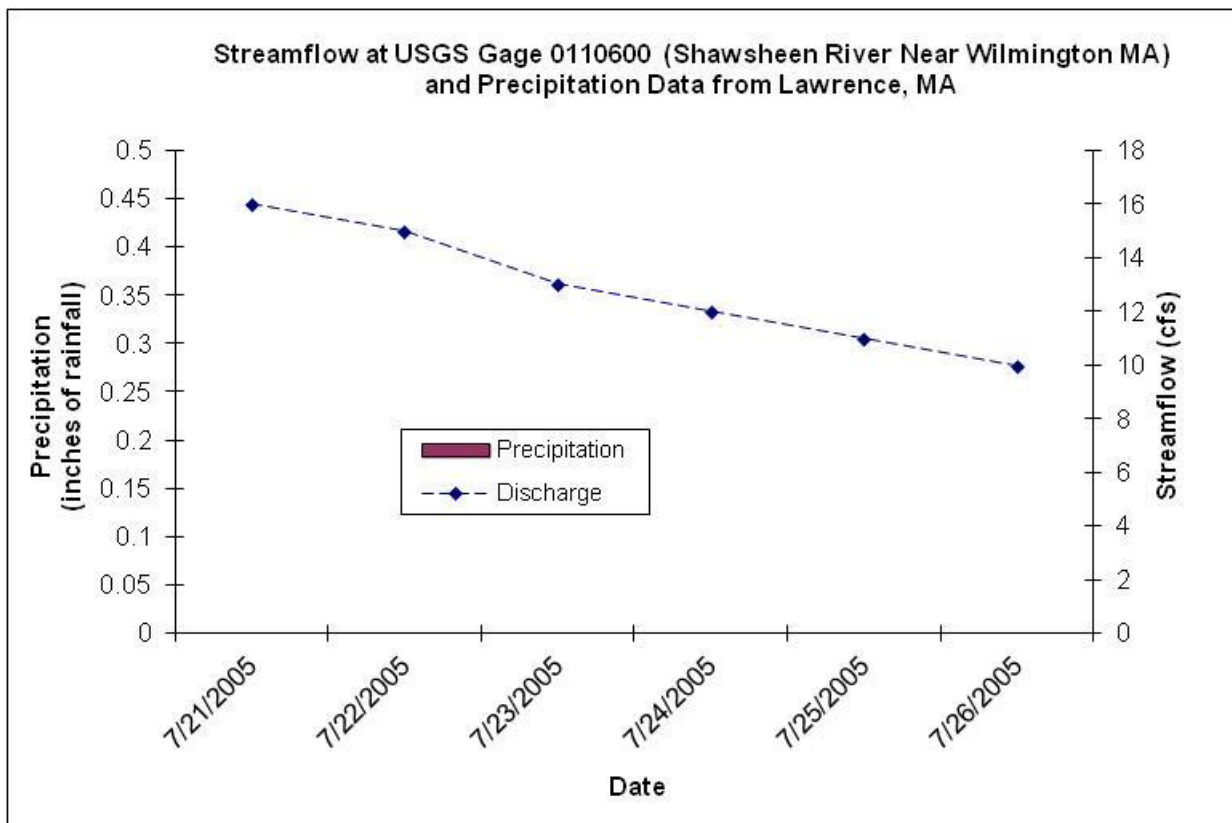


Figure 4: July 2005 flow versus precipitation for the Shawsheen River Watershed

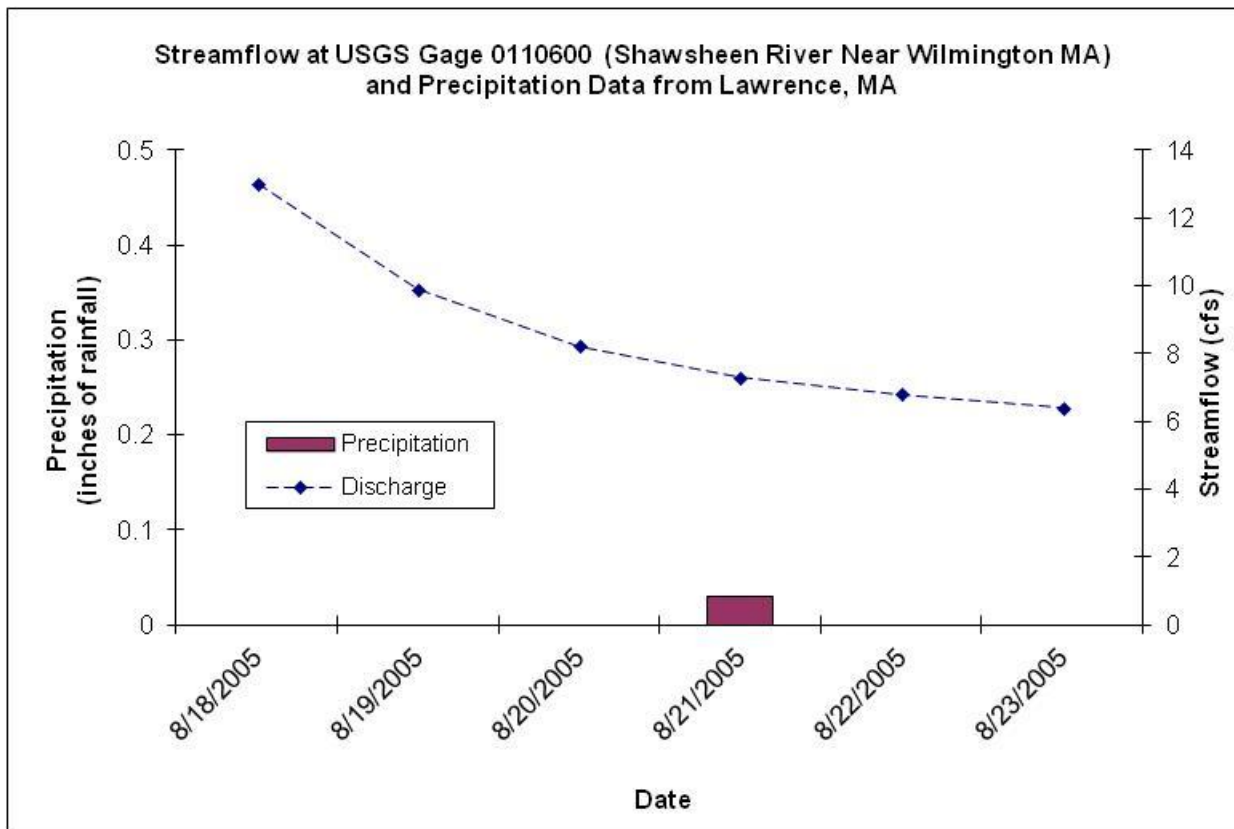


Figure 5: August 2005 flow versus precipitation for the Shawsheen River Watershed

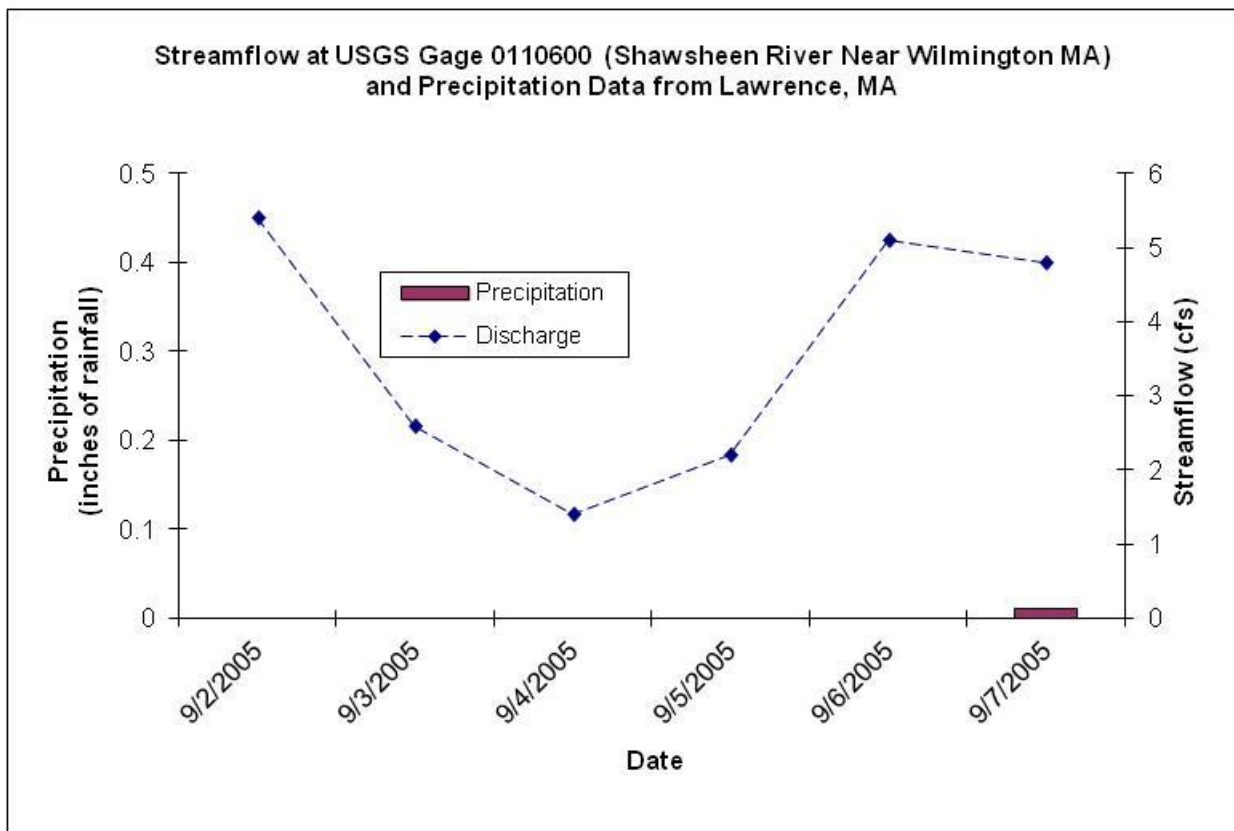


Figure 6: September 2-7 2005 flow versus precipitation for the Shawsheen River Watershed

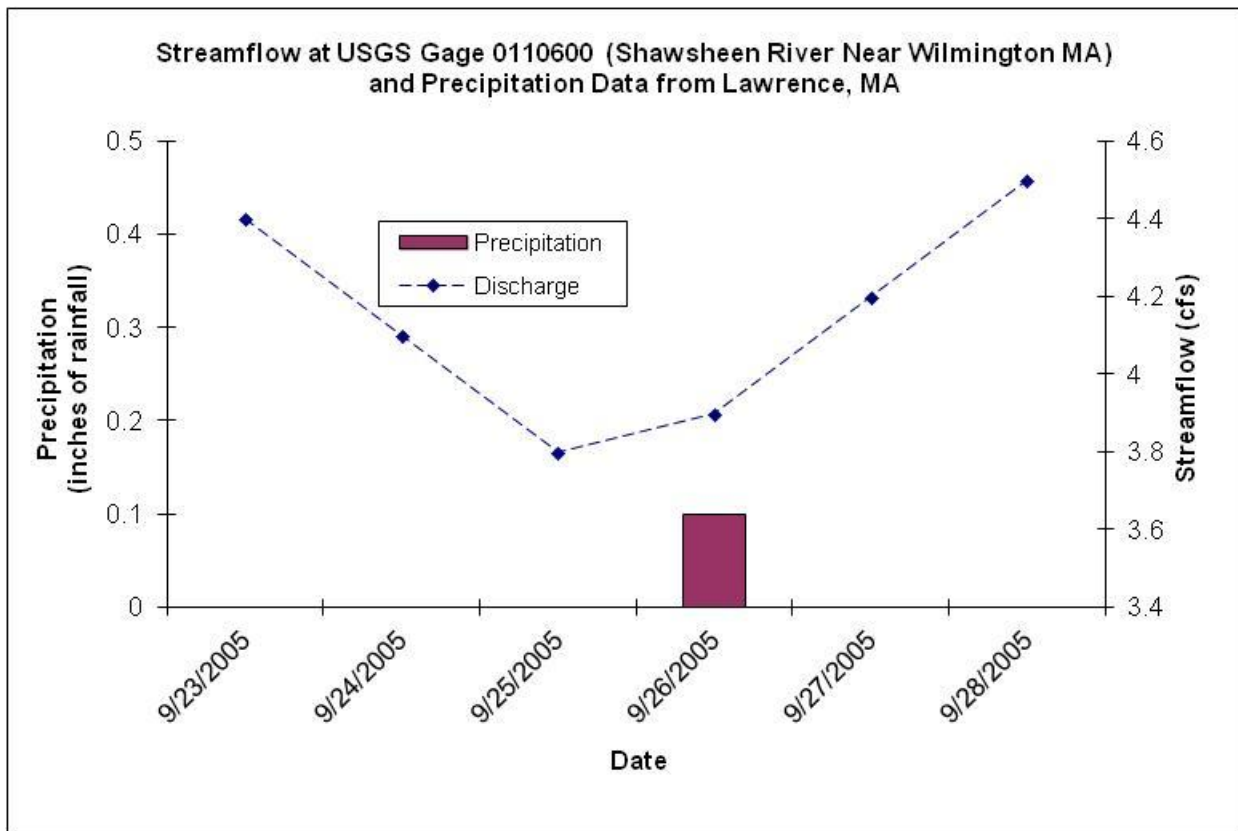


Figure 7: September 23-28 2005 flow versus precipitation for the Shawsheen River Watershed

Water Quality Data

All MassDEP DWM water quality data are managed and maintained in the Water Quality Data Access Database. Tables 5, 7, 8 and 9 below are 2005 data for the Shawsheen River Watershed. Table 6 presents the geometric mean of the *E. coli* samples. The procedures used to accept, accept with qualification or censor data are based on the DWM SOP for data validation and usability (MassDEP 2012a), and are in addition to separate quality assurance activities and laboratory validation steps undertaken by the WES. Data qualifiers are listed in Appendix 1.

Table 5. 2005 MassDEP Shawsheen River Watershed water quality data

Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0099	EB02	6/21/2005	930	83-0319		Ammonia-N	mg/L	0.12	--
W0099	EB02	6/21/2005	930	83-0319		Apparent color	PCU	190	--
W0099	EB02	6/21/2005	930	83-0319		<i>E. coli</i>	CFU/100 mL	590	e
W0099	EB02	6/21/2005	930	83-0319		Fecal Coliforms	CFU/100 mL	570	e
W0099	EB02	6/21/2005	930	83-0319		Total Nitrogen	mg/L	1.1	--
W0099	EB02	6/21/2005	930	83-0319		Total Phosphorus	mg/L	0.067	--
W0099	EB02	6/21/2005	930	83-0319		True Color	PCU	140	--
W0099	EB02	6/21/2005	930	83-0319		Turbidity	NTU	8.6	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Ammonia-N	mg/L	0.36	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Apparent color	PCU	130	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	<i>E. coli</i>	CFU/100 mL	130	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Turbidity	NTU	7.2	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Total Nitrogen	mg/L	1.0	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	True Color	PCU	85	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Fecal Coliforms	CFU/100 mL	170	--
W0093	SH01	6/21/2005	1000	83-0320	83-0321	Total Phosphorus	mg/L	0.049	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	<i>E. coli</i>	CFU/100 mL	130	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Ammonia-N	mg/L	0.35	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Apparent color	PCU	140	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Turbidity	NTU	7.9	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Total Nitrogen	mg/L	1.0	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	True Color	PCU	80	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Fecal Coliforms	CFU/100 mL	210	--
W0093	SH01	6/21/2005	1000	83-0321	83-0320	Total Phosphorus	mg/L	0.049	--
W0185	SH03	6/21/2005	1025	83-0323		<i>E. coli</i>	CFU/100 mL	140	--
W0185	SH03	6/21/2005	1025	83-0323		Fecal Coliforms	CFU/100 mL	140	--
W0357	VB02A	6/21/2005	1040	83-0324		Ammonia-N	mg/L	<0.02	--
W0357	VB02A	6/21/2005	1040	83-0324		Apparent color	PCU	90	--
W0357	VB02A	6/21/2005	1040	83-0324		<i>E. coli</i>	CFU/100 mL	58	--
W0357	VB02A	6/21/2005	1040	83-0324		Fecal Coliforms	CFU/100 mL	71	--
W0357	VB02A	6/21/2005	1040	83-0324		Total Nitrogen	mg/L	0.39	--
W0357	VB02A	6/21/2005	1040	83-0324		Total Phosphorus	mg/L	0.022	--
W0357	VB02A	6/21/2005	1040	83-0324		True Color	PCU	46	--
W0357	VB02A	6/21/2005	1040	83-0324		Turbidity	NTU	1.2	--
W1391	SB00	6/21/2005	1058	83-0325		<i>E. coli</i>	CFU/100 mL	560	--
W1391	SB00	6/21/2005	1058	83-0325		Fecal Coliforms	CFU/100 mL	740	--
W1390	LMB00	6/21/2005	1105	83-0326		<i>E. coli</i>	CFU/100 mL	450	e
W1390	LMB00	6/21/2005	1105	83-0326		Fecal Coliforms	CFU/100 mL	300	e
W0091	SH06	6/21/2005	1125	83-0327		Ammonia-N	mg/L	0.03	--
W0091	SH06	6/21/2005	1125	83-0327		Apparent color	PCU	140	--
W0091	SH06	6/21/2005	1125	83-0327		<i>E. coli</i>	CFU/100 mL	250	--
W0091	SH06	6/21/2005	1125	83-0327		Fecal Coliforms	CFU/100 mL	290	--
W0091	SH06	6/21/2005	1125	83-0327		Hardness	mg/L	81	--

Table 5. 2005 MassDEP Shawsheen River Watershed water quality data

Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0091	SH06	6/21/2005	1125	83-0327		Total Nitrogen	mg/L	0.69	--
W0091	SH06	6/21/2005	1125	83-0327		Total Phosphorus	mg/L	0.037	--
W0091	SH06	6/21/2005	1125	83-0327		True Color	PCU	70	--
W0091	SH06	6/21/2005	1125	83-0327		Turbidity	NTU	4.5	--
W0089	SH07	6/21/2005	1150	83-0328		<i>E. coli</i>	CFU/100 mL	97	e
W0089	SH07	6/21/2005	1150	83-0328		Fecal Coliforms	CFU/100 mL	84	e
W0750	CB01	6/21/2005	1205	83-0329		Ammonia-N	mg/L	0.13	--
W0750	CB01	6/21/2005	1205	83-0329		Apparent color	PCU	150	--
W0750	CB01	6/21/2005	1205	83-0329		<i>E. coli</i>	CFU/100 mL	380	--
W0750	CB01	6/21/2005	1205	83-0329		Fecal Coliforms	CFU/100 mL	390	--
W0750	CB01	6/21/2005	1205	83-0329		Hardness	mg/L	57	--
W0750	CB01	6/21/2005	1205	83-0329		Total Nitrogen	mg/L	1.6	--
W0750	CB01	6/21/2005	1205	83-0329		Total Phosphorus	mg/L	0.042	--
W0750	CB01	6/21/2005	1205	83-0329		True Color	PCU	90	--
W0750	CB01	6/21/2005	1205	83-0329		Turbidity	NTU	7.6	--
W0097	SW01	6/21/2005	1230	83-0330		Ammonia-N	mg/L	0.03	--
W0097	SW01	6/21/2005	1230	83-0330		Apparent color	PCU	140	--
W0097	SW01	6/21/2005	1230	83-0330		<i>E. coli</i>	CFU/100 mL	160	--
W0097	SW01	6/21/2005	1230	83-0330		Fecal Coliforms	CFU/100 mL	250	--
W0097	SW01	6/21/2005	1230	83-0330		Total Nitrogen	mg/L	0.65	--
W0097	SW01	6/21/2005	1230	83-0330		Total Phosphorus	mg/L	0.055	--
W0097	SW01	6/21/2005	1230	83-0330		True Color	PCU	90	--
W0097	SW01	6/21/2005	1230	83-0330		Turbidity	NTU	3.1	--
W1392	SR01	6/21/2005	1250	83-0331		Ammonia-N	mg/L	0.02	--
W1392	SR01	6/21/2005	1250	83-0331		Apparent color	PCU	120	--
W1392	SR01	6/21/2005	1250	83-0331		<i>E. coli</i>	CFU/100 mL	97	e
W1392	SR01	6/21/2005	1250	83-0331		Fecal Coliforms	CFU/100 mL	84	e
W1392	SR01	6/21/2005	1250	83-0331		Hardness	mg/L	67	--
W1392	SR01	6/21/2005	1250	83-0331		Total Nitrogen	mg/L	0.96	--
W1392	SR01	6/21/2005	1250	83-0331		Total Phosphorus	mg/L	0.045	--
W1392	SR01	6/21/2005	1250	83-0331		True Color	PCU	85	--
W1392	SR01	6/21/2005	1250	83-0331		Turbidity	NTU	7.0	--
W1393	PB00	6/21/2005	1320	83-0332		Ammonia-N	mg/L	0.24	--
W1393	PB00	6/21/2005	1320	83-0332		Apparent color	PCU	140	--
W1393	PB00	6/21/2005	1320	83-0332		<i>E. coli</i>	CFU/100 mL	97	--
W1393	PB00	6/21/2005	1320	83-0332		Fecal Coliforms	CFU/100 mL	100	--
W1393	PB00	6/21/2005	1320	83-0332		Total Nitrogen	mg/L	1.3	--
W1393	PB00	6/21/2005	1320	83-0332		Total Phosphorus	mg/L	0.071	--
W1393	PB00	6/21/2005	1320	83-0332		True Color	PCU	80	--
W1393	PB00	6/21/2005	1320	83-0332		Turbidity	NTU	4.0	--
W0086	SH09	6/21/2005	1345	83-0333		Ammonia-N	mg/L	0.06	--
W0086	SH09	6/21/2005	1345	83-0333		Apparent color	PCU	130	--
W0086	SH09	6/21/2005	1345	83-0333		<i>E. coli</i>	CFU/100 mL	150	e
W0086	SH09	6/21/2005	1345	83-0333		Fecal Coliforms	CFU/100 mL	130	e
W0086	SH09	6/21/2005	1345	83-0333		Hardness	mg/L	65	--
W0086	SH09	6/21/2005	1345	83-0333		Total Nitrogen	mg/L	0.94	--
W0086	SH09	6/21/2005	1345	83-0333		Total Phosphorus	mg/L	0.045	--
W0086	SH09	6/21/2005	1345	83-0333		True Color	PCU	70	--
W0086	SH09	6/21/2005	1345	83-0333		Turbidity	NTU	6.4	--
W0989	RB01A	6/21/2005	1415	83-0334		Ammonia-N	mg/L	0.12	--
W0989	RB01A	6/21/2005	1415	83-0334		Apparent color	PCU	240	--

Table 5. 2005 MassDEP Shawsheen River Watershed water quality data

Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0989	RB01A	6/21/2005	1415	83-0334		<i>E. coli</i>	CFU/100 mL	84	--
W0989	RB01A	6/21/2005	1415	83-0334		Fecal Coliforms	CFU/100 mL	84	--
W0989	RB01A	6/21/2005	1415	83-0334		Total Nitrogen	mg/L	1.4	--
W0989	RB01A	6/21/2005	1415	83-0334		Total Phosphorus	mg/L	0.083	--
W0989	RB01A	6/21/2005	1415	83-0334		True Color	PCU	230	--
W0989	RB01A	6/21/2005	1415	83-0334		Turbidity	NTU	3.5	--
W0082	SH11A	6/21/2005	1445	83-0335		<i>E. coli</i>	CFU/100 mL	290	--
W0082	SH11A	6/21/2005	1445	83-0335		Fecal Coliforms	CFU/100 mL	390	--
W0099	EB02	7/26/2005	856	83-0346		Ammonia-N	mg/L	0.09	--
W0099	EB02	7/26/2005	856	83-0346		Apparent color	PCU	110	--
W0099	EB02	7/26/2005	856	83-0346		Total Nitrogen	mg/L	0.88	--
W0099	EB02	7/26/2005	856	83-0346		Total Phosphorus	mg/L	0.056	--
W0099	EB02	7/26/2005	856	83-0346		True Color	PCU	60	--
W0099	EB02	7/26/2005	856	83-0346		Turbidity	NTU	11.0	--
W0099	EB02	7/26/2005	856	83-0346		<i>E. coli</i>	CFU/100 mL	1600	h
W0099	EB02	7/26/2005	856	83-0346		Fecal Coliforms	CFU/100 mL	2200	h
W0093	SH01	7/26/2005	952	83-0347	83-0348	Ammonia-N	mg/L	0.22	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	Apparent color	PCU	75	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	<i>E. coli</i>	CFU/100 mL	1600	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	Turbidity	NTU	8.6	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	Total Nitrogen	mg/L	1.1	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	Fecal Coliforms	CFU/100 mL	4600	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	True Color	PCU	47	--
W0093	SH01	7/26/2005	952	83-0347	83-0348	Total Phosphorus	mg/L	0.032	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Ammonia-N	mg/L	0.22	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	<i>E. coli</i>	CFU/100 mL	2000	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Apparent color	PCU	80	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Turbidity	NTU	8.9	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Total Nitrogen	mg/L	1.0	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Fecal Coliforms	CFU/100 mL	3200	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	True Color	PCU	50	--
W0093	SH01	7/26/2005	957	83-0348	83-0347	Total Phosphorus	mg/L	0.034	--
W0185	SH03	7/26/2005	1019	83-0350		<i>E. coli</i>	CFU/100 mL	52	e
W0185	SH03	7/26/2005	1019	83-0350		Fecal Coliforms	CFU/100 mL	26	e
W0357	VB02A	7/26/2005	1035	83-0351		Ammonia-N	mg/L	0.07	--
W0357	VB02A	7/26/2005	1035	83-0351		Apparent color	PCU	130	--
W0357	VB02A	7/26/2005	1035	83-0351		<i>E. coli</i>	CFU/100 mL	66	--
W0357	VB02A	7/26/2005	1035	83-0351		Fecal Coliforms	CFU/100 mL	100	--
W0357	VB02A	7/26/2005	1035	83-0351		Total Nitrogen	mg/L	1.1	--
W0357	VB02A	7/26/2005	1035	83-0351		Total Phosphorus	mg/L	0.41	--
W0357	VB02A	7/26/2005	1035	83-0351		True Color	PCU	130	--
W0357	VB02A	7/26/2005	1035	83-0351		Turbidity	NTU	21.5	--
W1391	SB00	7/26/2005	1053	83-0352		<i>E. coli</i>	CFU/100 mL	430	e
W1391	SB00	7/26/2005	1053	83-0352		Fecal Coliforms	CFU/100 mL	200	e
W1390	LMB00	7/26/2005	1103	83-0353		<i>E. coli</i>	CFU/100 mL	2200	--
W1390	LMB00	7/26/2005	1103	83-0353		Fecal Coliforms	CFU/100 mL	3000	--
W0091	SH06	7/26/2005	1125	83-0354		Ammonia-N	mg/L	0.02	--
W0091	SH06	7/26/2005	1125	83-0354		Apparent color	PCU	42	--
W0091	SH06	7/26/2005	1125	83-0354		<i>E. coli</i>	CFU/100 mL	66	--
W0091	SH06	7/26/2005	1125	83-0354		Fecal Coliforms	CFU/100 mL	120	--
W0091	SH06	7/26/2005	1125	83-0354		Hardness	mg/L	96	--

Table 5. 2005 MassDEP Shawsheen River Watershed water quality data

Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0091	SH06	7/26/2005	1125	83-0354		Total Nitrogen	mg/L	0.68	--
W0091	SH06	7/26/2005	1125	83-0354		Total Phosphorus	mg/L	0.021	--
W0091	SH06	7/26/2005	1125	83-0354		True Color	PCU	42	--
W0091	SH06	7/26/2005	1125	83-0354		Turbidity	NTU	1.8	--
W0089	SH07	7/26/2005	1200	83-0355		<i>E. coli</i>	CFU/100 mL	39	e
W0089	SH07	7/26/2005	1200	83-0355		Fecal Coliforms	CFU/100 mL	26	e
W0750	CB01	7/26/2005	1214	83-0356		Ammonia-N	mg/L	0.13	--
W0750	CB01	7/26/2005	1214	83-0356		Apparent color	PCU	120	--
W0750	CB01	7/26/2005	1214	83-0356		<i>E. coli</i>	CFU/100 mL	230	e
W0750	CB01	7/26/2005	1214	83-0356		Fecal Coliforms	CFU/100 mL	140	e
W0750	CB01	7/26/2005	1214	83-0356		Hardness	mg/L	73	--
W0750	CB01	7/26/2005	1214	83-0356		Total Nitrogen	mg/L	1.8	--
W0750	CB01	7/26/2005	1214	83-0356		Total Phosphorus	mg/L	0.049	--
W0750	CB01	7/26/2005	1214	83-0356		True Color	PCU	65	--
W0750	CB01	7/26/2005	1214	83-0356		Turbidity	NTU	13.5	--
W0097	SW01	7/26/2005	1245	83-0357		Ammonia-N	mg/L	0.06	--
W0097	SW01	7/26/2005	1245	83-0357		Apparent color	PCU	75	--
W0097	SW01	7/26/2005	1245	83-0357		<i>E. coli</i>	CFU/100 mL	58	--
W0097	SW01	7/26/2005	1245	83-0357		Fecal Coliforms	CFU/100 mL	84	--
W0097	SW01	7/26/2005	1245	83-0357		Total Nitrogen	mg/L	0.94	--
W0097	SW01	7/26/2005	1245	83-0357		Total Phosphorus	mg/L	0.10	--
W0097	SW01	7/26/2005	1245	83-0357		True Color	PCU	60	--
W0097	SW01	7/26/2005	1245	83-0357		Turbidity	NTU	3.3	--
W1392	SR01	7/26/2005	1311	83-0358		Ammonia-N	mg/L	0.07	--
W1392	SR01	7/26/2005	1311	83-0358		Apparent color	PCU	55	--
W1392	SR01	7/26/2005	1311	83-0358		<i>E. coli</i>	CFU/100 mL	140	e
W1392	SR01	7/26/2005	1311	83-0358		Fecal Coliforms	CFU/100 mL	97	e
W1392	SR01	7/26/2005	1311	83-0358		Hardness	mg/L	78	--
W1392	SR01	7/26/2005	1311	83-0358		Total Nitrogen	mg/L	0.85	--
W1392	SR01	7/26/2005	1311	83-0358		Total Phosphorus	mg/L	0.025	--
W1392	SR01	7/26/2005	1311	83-0358		True Color	PCU	48	--
W1392	SR01	7/26/2005	1311	83-0358		Turbidity	NTU	4.1	--
W1393	PB00	7/26/2005	1343	83-0359		Ammonia-N	mg/L	0.15	--
W1393	PB00	7/26/2005	1343	83-0359		Apparent color	PCU	55	--
W1393	PB00	7/26/2005	1343	83-0359		<i>E. coli</i>	CFU/100 mL	77	--
W1393	PB00	7/26/2005	1343	83-0359		Fecal Coliforms	CFU/100 mL	90	--
W1393	PB00	7/26/2005	1343	83-0359		Total Nitrogen	mg/L	0.91	a
W1393	PB00	7/26/2005	1343	83-0359		Total Phosphorus	mg/L	0.070	--
W1393	PB00	7/26/2005	1343	83-0359		True Color	PCU	47	--
W1393	PB00	7/26/2005	1343	83-0359		Turbidity	NTU	4.4	--
W0086	SH09	7/26/2005	1412	83-0360		Ammonia-N	mg/L	0.03	--
W0086	SH09	7/26/2005	1412	83-0360		Apparent color	PCU	55	--
W0086	SH09	7/26/2005	1412	83-0360		<i>E. coli</i>	CFU/100 mL	45	--
W0086	SH09	7/26/2005	1412	83-0360		Fecal Coliforms	CFU/100 mL	77	--
W0086	SH09	7/26/2005	1412	83-0360		Hardness	mg/L	76	--
W0086	SH09	7/26/2005	1412	83-0360		Total Nitrogen	mg/L	0.79	--
W0086	SH09	7/26/2005	1412	83-0360		Total Phosphorus	mg/L	0.030	--
W0086	SH09	7/26/2005	1412	83-0360		True Color	PCU	45	--
W0086	SH09	7/26/2005	1412	83-0360		Turbidity	NTU	2.6	--
W0989	RB01A	7/26/2005	1435	83-0361		Ammonia-N	mg/L	0.07	--
W0989	RB01A	7/26/2005	1435	83-0361		Apparent color	PCU	140	--

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0989	RB01A	7/26/2005	1435	83-0361		<i>E. coli</i>	CFU/100 mL	520	--
W0989	RB01A	7/26/2005	1435	83-0361		Fecal Coliforms	CFU/100 mL	590	--
W0989	RB01A	7/26/2005	1435	83-0361		Total Nitrogen	mg/L	1.4	--
W0989	RB01A	7/26/2005	1435	83-0361		Total Phosphorus	mg/L	0.052	--
W0989	RB01A	7/26/2005	1435	83-0361		True Color	PCU	50	--
W0989	RB01A	7/26/2005	1435	83-0361		Turbidity	NTU	1.6	--
W0082	SH11A	7/26/2005	1514	83-0362		<i>E. coli</i>	CFU/100 mL	4800	--
W0082	SH11A	7/26/2005	1514	83-0362		Fecal Coliforms	CFU/100 mL	6400	--
W0099	EB02	8/23/2005	921	83-0376		Ammonia-N	mg/L	##	b
W0099	EB02	8/23/2005	921	83-0376		Apparent color	PCU	##	b
W0099	EB02	8/23/2005	921	83-0376		Total Nitrogen	mg/L	##	b
W0099	EB02	8/23/2005	921	83-0376		Total Phosphorus	mg/L	##	b
W0099	EB02	8/23/2005	921	83-0376		True Color	PCU	##	b
W0099	EB02	8/23/2005	921	83-0376		Turbidity	NTU	##	b
W0099	EB02	8/23/2005	921	83-0376		<i>E. coli</i>	CFU/100 mL	##	h,b
W0099	EB02	8/23/2005	921	83-0376		Fecal Coliforms	CFU/100 mL	##	h,b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Ammonia-N	mg/L	##	b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Apparent color	PCU	##	b
W0093	SH01	8/23/2005	953	83-0377	83-0378	<i>E. coli</i>	CFU/100 mL	##	h,b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Total Nitrogen	mg/L	##	b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Turbidity	NTU	##	b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Fecal Coliforms	CFU/100 mL	##	h,b
W0093	SH01	8/23/2005	953	83-0377	83-0378	True Color	PCU	##	b
W0093	SH01	8/23/2005	953	83-0377	83-0378	Total Phosphorus	mg/L	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Ammonia-N	mg/L	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	<i>E. coli</i>	CFU/100 mL	##	h,b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Apparent color	PCU	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Total Nitrogen	mg/L	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Turbidity	NTU	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Fecal Coliforms	CFU/100 mL	##	h,b
W0093	SH01	8/23/2005	953	83-0378	83-0377	True Color	PCU	##	b
W0093	SH01	8/23/2005	953	83-0378	83-0377	Total Phosphorus	mg/L	##	b
W0185	SH03	8/23/2005	1020	83-0405		<i>E. coli</i>	CFU/100 mL	##	h,b
W0185	SH03	8/23/2005	1020	83-0405		Fecal Coliforms	CFU/100 mL	##	h,b
W0357	VB02A	8/23/2005	1035	83-0406		Ammonia-N	mg/L	##	b
W0357	VB02A	8/23/2005	1035	83-0406		Apparent color	PCU	##	b
W0357	VB02A	8/23/2005	1035	83-0406		Total Nitrogen	mg/L	##	b
W0357	VB02A	8/23/2005	1035	83-0406		Total Phosphorus	mg/L	##	b
W0357	VB02A	8/23/2005	1035	83-0406		True Color	PCU	##	b
W0357	VB02A	8/23/2005	1035	83-0406		Turbidity	NTU	##	b
W0357	VB02A	8/23/2005	1035	83-0406		<i>E. coli</i>	CFU/100 mL	##	h,b
W0357	VB02A	8/23/2005	1035	83-0406		Fecal Coliforms	CFU/100 mL	##	h,b
W1391	SB00	8/23/2005	1100	83-0407		<i>E. coli</i>	CFU/100 mL	##	h,b
W1391	SB00	8/23/2005	1100	83-0407		Fecal Coliforms	CFU/100 mL	##	h,b
W1390	LMB00	8/23/2005	1120	83-0408		<i>E. coli</i>	CFU/100 mL	##	h,b
W1390	LMB00	8/23/2005	1120	83-0408		Fecal Coliforms	CFU/100 mL	##	h,b
W0091	SH06	8/23/2005	1239	83-0409		Ammonia-N	mg/L	##	b
W0091	SH06	8/23/2005	1239	83-0409		Apparent color	PCU	##	b
W0091	SH06	8/23/2005	1239	83-0409		Hardness	mg/L	92	--
W0091	SH06	8/23/2005	1239	83-0409		Total Nitrogen	mg/L	##	b
W0091	SH06	8/23/2005	1239	83-0409		Total Phosphorus	mg/L	##	b

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0091	SH06	8/23/2005	1239	83-0409		True Color	PCU	##	b
W0091	SH06	8/23/2005	1239	83-0409		Turbidity	NTU	##	b
W0091	SH06	8/23/2005	1239	83-0409		<i>E. coli</i>	CFU/100 mL	##	h,b
W0091	SH06	8/23/2005	1239	83-0409		Fecal Coliforms	CFU/100 mL	##	h,b
W0089	SH07	8/23/2005	1155	83-0410		<i>E. coli</i>	CFU/100 mL	##	h,b,e
W0089	SH07	8/23/2005	1155	83-0410		Fecal Coliforms	CFU/100 mL	##	h,b,e
W0750	CB01	8/23/2005	1211	83-0411		Ammonia-N	mg/L	##	b
W0750	CB01	8/23/2005	1211	83-0411		Apparent color	PCU	##	b
W0750	CB01	8/23/2005	1211	83-0411		Hardness	mg/L	77	--
W0750	CB01	8/23/2005	1211	83-0411		Total Nitrogen	mg/L	##	b
W0750	CB01	8/23/2005	1211	83-0411		Total Phosphorus	mg/L	##	b
W0750	CB01	8/23/2005	1211	83-0411		True Color	PCU	##	b
W0750	CB01	8/23/2005	1211	83-0411		Turbidity	NTU	##	b
W0750	CB01	8/23/2005	1211	83-0411		<i>E. coli</i>	CFU/100 mL	##	h,b
W0750	CB01	8/23/2005	1211	83-0411		Fecal Coliforms	CFU/100 mL	##	h,b
W0097	SW01	8/23/2005	1302	83-0412		Ammonia-N	mg/L	##	b
W0097	SW01	8/23/2005	1302	83-0412		Apparent color	PCU	##	b
W0097	SW01	8/23/2005	1302	83-0412		Total Nitrogen	mg/L	##	b
W0097	SW01	8/23/2005	1302	83-0412		Total Phosphorus	mg/L	##	b
W0097	SW01	8/23/2005	1302	83-0412		True Color	PCU	##	b
W0097	SW01	8/23/2005	1302	83-0412		Turbidity	NTU	##	b
W0097	SW01	8/23/2005	1302	83-0412		<i>E. coli</i>	CFU/100 mL	##	h,b
W0097	SW01	8/23/2005	1302	83-0412		Fecal Coliforms	CFU/100 mL	##	h,b
W1392	SR01	8/23/2005	1322	83-0413		Ammonia-N	mg/L	##	b
W1392	SR01	8/23/2005	1322	83-0413		Apparent color	PCU	##	b
W1392	SR01	8/23/2005	1322	83-0413		Hardness	mg/L	81	--
W1392	SR01	8/23/2005	1322	83-0413		Total Nitrogen	mg/L	##	b
W1392	SR01	8/23/2005	1322	83-0413		Total Phosphorus	mg/L	##	b
W1392	SR01	8/23/2005	1322	83-0413		True Color	PCU	##	b
W1392	SR01	8/23/2005	1322	83-0413		Turbidity	NTU	##	b
W1392	SR01	8/23/2005	1322	83-0413		<i>E. coli</i>	CFU/100 mL	##	h,b
W1392	SR01	8/23/2005	1322	83-0413		Fecal Coliforms	CFU/100 mL	##	h,b
W1393	PB00	8/23/2005	1353	83-0414		Ammonia-N	mg/L	##	b
W1393	PB00	8/23/2005	1353	83-0414		Apparent color	PCU	##	b
W1393	PB00	8/23/2005	1353	83-0414		Total Nitrogen	mg/L	##	b
W1393	PB00	8/23/2005	1353	83-0414		Total Phosphorus	mg/L	##	b
W1393	PB00	8/23/2005	1353	83-0414		True Color	PCU	##	b
W1393	PB00	8/23/2005	1353	83-0414		Turbidity	NTU	##	b
W1393	PB00	8/23/2005	1353	83-0414		<i>E. coli</i>	CFU/100 mL	##	h,b
W1393	PB00	8/23/2005	1353	83-0414		Fecal Coliforms	CFU/100 mL	##	h,b
W0086	SH09	8/23/2005	1420	83-0415		Ammonia-N	mg/L	##	b
W0086	SH09	8/23/2005	1420	83-0415		Apparent color	PCU	##	b
W0086	SH09	8/23/2005	1420	83-0415		Hardness	mg/L	76	--
W0086	SH09	8/23/2005	1420	83-0415		Total Nitrogen	mg/L	##	b
W0086	SH09	8/23/2005	1420	83-0415		Total Phosphorus	mg/L	##	b
W0086	SH09	8/23/2005	1420	83-0415		True Color	PCU	##	b
W0086	SH09	8/23/2005	1420	83-0415		Turbidity	NTU	##	b
W0086	SH09	8/23/2005	1420	83-0415		<i>E. coli</i>	CFU/100 mL	##	h,b
W0086	SH09	8/23/2005	1420	83-0415		Fecal Coliforms	CFU/100 mL	##	h,b
W0989	RB01A	8/23/2005	1441	83-0416		Ammonia-N	mg/L	##	b
W0989	RB01A	8/23/2005	1441	83-0416		Apparent color	PCU	##	b

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0989	RB01A	8/23/2005	1441	83-0416		Total Nitrogen	mg/L	##	b
W0989	RB01A	8/23/2005	1441	83-0416		Total Phosphorus	mg/L	##	b
W0989	RB01A	8/23/2005	1441	83-0416		True Color	PCU	##	b
W0989	RB01A	8/23/2005	1441	83-0416		Turbidity	NTU	##	b
W0989	RB01A	8/23/2005	1441	83-0416		<i>E. coli</i>	CFU/100 mL	##	h,b
W0989	RB01A	8/23/2005	1441	83-0416		Fecal Coliforms	CFU/100 mL	##	h,b
W0082	SH11A	8/23/2005	1520	83-0417		<i>E. coli</i>	CFU/100 mL	##	h,b
W0082	SH11A	8/23/2005	1520	83-0417		Fecal Coliforms	CFU/100 mL	##	h,b
W0093	SH01	9/7/2005	915	83-0418	83-0419	<i>E. coli</i>	CFU/100 mL	84	--
W0093	SH01	9/7/2005	915	83-0418	83-0419	Fecal Coliforms	CFU/100 mL	150	--
W0093	SH01	9/7/2005	915	83-0419	83-0418	<i>E. coli</i>	CFU/100 mL	93	--
W0093	SH01	9/7/2005	915	83-0419	83-0418	Fecal Coliforms	CFU/100 mL	93	--
W0185	SH03	9/7/2005	930	83-0421		<i>E. coli</i>	CFU/100 mL	39	--
W0185	SH03	9/7/2005	930	83-0421		Fecal Coliforms	CFU/100 mL	130	--
W0357	VB02A	9/7/2005	938	83-0422		<i>E. coli</i>	CFU/100 mL	32	--
W0357	VB02A	9/7/2005	938	83-0422		Fecal Coliforms	CFU/100 mL	58	--
W1391	SB00	9/7/2005	940	83-0423		<i>E. coli</i>	CFU/100 mL	210	e
W1391	SB00	9/7/2005	940	83-0423		Fecal Coliforms	CFU/100 mL	190	e
W0091	SH06	9/7/2005	1000	83-0425		<i>E. coli</i>	CFU/100 mL	430	--
W0091	SH06	9/7/2005	1000	83-0425		Fecal Coliforms	CFU/100 mL	530	--
W0089	SH07	9/7/2005	1018	83-0426		<i>E. coli</i>	CFU/100 mL	58	--
W0089	SH07	9/7/2005	1018	83-0426		Fecal Coliforms	CFU/100 mL	77	--
W0750	CB01	9/7/2005	1026	83-0427		<i>E. coli</i>	CFU/100 mL	290	--
W0750	CB01	9/7/2005	1026	83-0427		Fecal Coliforms	CFU/100 mL	290	--
W0097	SW01	9/7/2005	1040	83-0428		<i>E. coli</i>	CFU/100 mL	97	e
W0097	SW01	9/7/2005	1040	83-0428		Fecal Coliforms	CFU/100 mL	65	e
W1392	SR01	9/7/2005	1046	83-0429		<i>E. coli</i>	CFU/100 mL	120	e
W1392	SR01	9/7/2005	1046	83-0429		Fecal Coliforms	CFU/100 mL	110	e
W1393	PB00	9/7/2005	1105	83-0430		<i>E. coli</i>	CFU/100 mL	440	e
W1393	PB00	9/7/2005	1105	83-0430		Fecal Coliforms	CFU/100 mL	390	e
W0086	SH09	9/7/2005	1122	83-0431		<i>E. coli</i>	CFU/100 mL	67	e
W0086	SH09	9/7/2005	1122	83-0431		Fecal Coliforms	CFU/100 mL	60	e
W0989	RB01A	9/7/2005	1134	83-0432		<i>E. coli</i>	CFU/100 mL	290	--
W0989	RB01A	9/7/2005	1134	83-0432		Fecal Coliforms	CFU/100 mL	450	--
W0082	SH11A	9/7/2005	1203	83-0433		<i>E. coli</i>	CFU/100 mL	160	--
W0082	SH11A	9/7/2005	1203	83-0433		Fecal Coliforms	CFU/100 mL	220	--
W0099	EB02	9/7/2005	904	83-0434		<i>E. coli</i>	CFU/100 mL	870	e
W0099	EB02	9/7/2005	904	83-0434		Fecal Coliforms	CFU/100 mL	770	e
W0099	EB02	5/24/2005	900	83-0469		Ammonia-N	mg/L	0.08	--
W0099	EB02	5/24/2005	900	83-0469		Apparent color	PCU	140	--
W0099	EB02	5/24/2005	900	83-0469		<i>E. coli</i>	CFU/100 mL	1200	--
W0099	EB02	5/24/2005	900	83-0469		Fecal Coliforms	CFU/100 mL	1200	--
W0099	EB02	5/24/2005	900	83-0469		Total Nitrogen	mg/L	1.2	--
W0099	EB02	5/24/2005	900	83-0469		Total Phosphorus	mg/L	0.11	--
W0099	EB02	5/24/2005	900	83-0469		True Color	PCU	110	--
W0099	EB02	5/24/2005	900	83-0469		Turbidity	NTU	18.0	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Ammonia-N	mg/L	0.18	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Apparent color	PCU	75	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	<i>E. coli</i>	CFU/100 mL	440	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Total Nitrogen	mg/L	0.86	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Turbidity	NTU	5.7	--

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0093	SH01	5/24/2005	930	83-0470	83-0471	True Color	PCU	35	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Fecal Coliforms	CFU/100 mL	520	--
W0093	SH01	5/24/2005	930	83-0470	83-0471	Total Phosphorus	mg/L	0.050	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	Ammonia-N	mg/L	0.18	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	Apparent color	PCU	65	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	<i>E. coli</i>	CFU/100 mL	530	e
W0093	SH01	5/24/2005	930	83-0471	83-0470	Total Nitrogen	mg/L	0.85	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	Turbidity	NTU	4.8	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	Fecal Coliforms	CFU/100 mL	380	e
W0093	SH01	5/24/2005	930	83-0471	83-0470	True Color	PCU	44	--
W0093	SH01	5/24/2005	930	83-0471	83-0470	Total Phosphorus	mg/L	0.051	--
W0185	SH03	5/24/2005	955	83-0473		<i>E. coli</i>	CFU/100 mL	180	--
W0185	SH03	5/24/2005	955	83-0473		Fecal Coliforms	CFU/100 mL	360	--
W0357	VB02A	5/24/2005	1017	83-0474		Ammonia-N	mg/L	<0.02	--
W0357	VB02A	5/24/2005	1017	83-0474		Apparent color	PCU	41	--
W0357	VB02A	5/24/2005	1017	83-0474		<i>E. coli</i>	CFU/100 mL	290	e
W0357	VB02A	5/24/2005	1017	83-0474		Fecal Coliforms	CFU/100 mL	230	e
W0357	VB02A	5/24/2005	1017	83-0474		Total Phosphorus	mg/L	0.020	--
W0357	VB02A	5/24/2005	1017	83-0474		True Color	PCU	40	--
W0357	VB02A	5/24/2005	1017	83-0474		Turbidity	NTU	1.1	--
W0357	VB02A	5/24/2005	1017	83-0474		Total Nitrogen	mg/L	0.30	h
W1391	SB00	5/24/2005	1030	83-0475		<i>E. coli</i>	CFU/100 mL	1800	--
W1391	SB00	5/24/2005	1030	83-0475		Fecal Coliforms	CFU/100 mL	1800	--
W1390	LMB00	5/24/2005	1040	83-0476		<i>E. coli</i>	CFU/100 mL	2200	--
W1390	LMB00	5/24/2005	1040	83-0476		Fecal Coliforms	CFU/100 mL	3000	--
W0091	SH06	5/24/2005	1115	83-0477		Ammonia-N	mg/L	0.07	--
W0091	SH06	5/24/2005	1115	83-0477		Apparent color	PCU	75	--
W0091	SH06	5/24/2005	1115	83-0477		<i>E. coli</i>	CFU/100 mL	4800	e
W0091	SH06	5/24/2005	1115	83-0477		Fecal Coliforms	CFU/100 mL	2600	e
W0091	SH06	5/24/2005	1115	83-0477		Hardness	mg/L	66	--
W0091	SH06	5/24/2005	1115	83-0477		Total Nitrogen	mg/L	0.82	--
W0091	SH06	5/24/2005	1115	83-0477		Total Phosphorus	mg/L	0.072	--
W0091	SH06	5/24/2005	1115	83-0477		True Color	PCU	45	--
W0091	SH06	5/24/2005	1115	83-0477		Turbidity	NTU	12.5	--
W0089	SH07	5/24/2005	1130	83-0478		<i>E. coli</i>	CFU/100 mL	310	--
W0089	SH07	5/24/2005	1130	83-0478		Fecal Coliforms	CFU/100 mL	410	--
W0750	CB01	5/24/2005	1145	83-0479		Ammonia-N	mg/L	0.77	--
W0750	CB01	5/24/2005	1145	83-0479		Apparent color	PCU	80	--
W0750	CB01	5/24/2005	1145	83-0479		<i>E. coli</i>	CFU/100 mL	410	--
W0750	CB01	5/24/2005	1145	83-0479		Fecal Coliforms	CFU/100 mL	420	--
W0750	CB01	5/24/2005	1145	83-0479		Hardness	mg/L	52	--
W0750	CB01	5/24/2005	1145	83-0479		Total Nitrogen	mg/L	2.1	--
W0750	CB01	5/24/2005	1145	83-0479		Total Phosphorus	mg/L	0.049	--
W0750	CB01	5/24/2005	1145	83-0479		True Color	PCU	41	--
W0750	CB01	5/24/2005	1145	83-0479		Turbidity	NTU	6.3	--
W0097	SW01	5/24/2005	1205	83-0480		Ammonia-N	mg/L	0.02	--
W0097	SW01	5/24/2005	1205	83-0480		Apparent color	PCU	70	--
W0097	SW01	5/24/2005	1205	83-0480		<i>E. coli</i>	CFU/100 mL	300	--
W0097	SW01	5/24/2005	1205	83-0480		Fecal Coliforms	CFU/100 mL	360	--
W0097	SW01	5/24/2005	1205	83-0480		Total Nitrogen	mg/L	0.52	--
W0097	SW01	5/24/2005	1205	83-0480		Total Phosphorus	mg/L	0.045	--

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0097	SW01	5/24/2005	1205	83-0480		True Color	PCU	55	--
W0097	SW01	5/24/2005	1205	83-0480		Turbidity	NTU	3.4	--
W1392	SR01	5/24/2005	1228	83-0481		Ammonia-N	mg/L	0.10	--
W1392	SR01	5/24/2005	1228	83-0481		Apparent color	PCU	60	--
W1392	SR01	5/24/2005	1228	83-0481		<i>E. coli</i>	CFU/100 mL	300	--
W1392	SR01	5/24/2005	1228	83-0481		Fecal Coliforms	CFU/100 mL	360	--
W1392	SR01	5/24/2005	1228	83-0481		Hardness	mg/L	63	--
W1392	SR01	5/24/2005	1228	83-0481		Total Nitrogen	mg/L	0.91	--
W1392	SR01	5/24/2005	1228	83-0481		Total Phosphorus	mg/L	0.036	--
W1392	SR01	5/24/2005	1228	83-0481		True Color	PCU	44	--
W1392	SR01	5/24/2005	1228	83-0481		Turbidity	NTU	5.3	--
W1393	PB00	5/24/2005	1250	83-0482		Ammonia-N	mg/L	0.18	--
W1393	PB00	5/24/2005	1250	83-0482		Apparent color	PCU	85	--
W1393	PB00	5/24/2005	1250	83-0482		<i>E. coli</i>	CFU/100 mL	400	--
W1393	PB00	5/24/2005	1250	83-0482		Fecal Coliforms	CFU/100 mL	2000	--
W1393	PB00	5/24/2005	1250	83-0482		Total Nitrogen	mg/L	1.1	--
W1393	PB00	5/24/2005	1250	83-0482		True Color	PCU	60	--
W1393	PB00	5/24/2005	1250	83-0482		Turbidity	NTU	10.5	--
W1393	PB00	5/24/2005	1250	83-0482		Total Phosphorus	mg/L	0.12	h
W0086	SH09	5/24/2005	1345	83-0483		Ammonia-N	mg/L	0.07	--
W0086	SH09	5/24/2005	1345	83-0483		Apparent color	PCU	65	--
W0086	SH09	5/24/2005	1345	83-0483		<i>E. coli</i>	CFU/100 mL	230	--
W0086	SH09	5/24/2005	1345	83-0483		Fecal Coliforms	CFU/100 mL	250	--
W0086	SH09	5/24/2005	1345	83-0483		Hardness	mg/L	61	--
W0086	SH09	5/24/2005	1345	83-0483		Total Nitrogen	mg/L	0.92	--
W0086	SH09	5/24/2005	1345	83-0483		True Color	PCU	55	--
W0086	SH09	5/24/2005	1345	83-0483		Turbidity	NTU	8.3	--
W0086	SH09	5/24/2005	1345	83-0483		Total Phosphorus	mg/L	0.040	h
W0989	RB01A	5/24/2005	1325	83-0484		Ammonia-N	mg/L	0.02	--
W0989	RB01A	5/24/2005	1325	83-0484		Apparent color	PCU	90	--
W0989	RB01A	5/24/2005	1325	83-0484		<i>E. coli</i>	CFU/100 mL	1600	--
W0989	RB01A	5/24/2005	1325	83-0484		Fecal Coliforms	CFU/100 mL	1800	--
W0989	RB01A	5/24/2005	1325	83-0484		True Color	PCU	55	--
W0989	RB01A	5/24/2005	1325	83-0484		Turbidity	NTU	9.0	--
W0989	RB01A	5/24/2005	1325	83-0484		Total Nitrogen	mg/L	0.92	h
W0989	RB01A	5/24/2005	1325	83-0484		Total Phosphorus	mg/L	0.072	h
W0082	SH11A	5/24/2005	1415	83-0485		<i>E. coli</i>	CFU/100 mL	620	--
W0082	SH11A	5/24/2005	1415	83-0485		Fecal Coliforms	CFU/100 mL	1400	--
W0099	EB02	9/28/2005	905	83-0630		Ammonia-N	mg/L	0.10	--
W0099	EB02	9/28/2005	905	83-0630		Apparent color	PCU	80	e
W0099	EB02	9/28/2005	905	83-0630		<i>E. coli</i>	CFU/100 mL	1800	--
W0099	EB02	9/28/2005	905	83-0630		Fecal Coliforms	CFU/100 mL	2000	--
W0099	EB02	9/28/2005	905	83-0630		Total Nitrogen	mg/L	0.68	--
W0099	EB02	9/28/2005	905	83-0630		Total Phosphorus	mg/L	0.052	--
W0099	EB02	9/28/2005	905	83-0630		True Color	PCU	100	e
W0099	EB02	9/28/2005	905	83-0630		Turbidity	NTU	8.5	--
W0093	SH01	9/28/2005	927	83-0631	83-0632	Ammonia-N	mg/L	0.13	--
W0093	SH01	9/28/2005	927	83-0631	83-0632	Apparent color	PCU	100	--
W0093	SH01	9/28/2005	927	83-0631	83-0632	<i>E. coli</i>	CFU/100 mL	150	e
W0093	SH01	9/28/2005	927	83-0631	83-0632	Total Nitrogen	mg/L	0.71	--
W0093	SH01	9/28/2005	927	83-0631	83-0632	Turbidity	NTU	6.7	--

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W0093	SH01	9/28/2005	927	83-0631	83-0632	True Color	PCU	100	--
W0093	SH01	9/28/2005	927	83-0631	83-0632	Fecal Coliforms	CFU/100 mL	130	e
W0093	SH01	9/28/2005	927	83-0631	83-0632	Total Phosphorus	mg/L	0.047	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	Ammonia-N	mg/L	0.13	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	Apparent color	PCU	95	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	<i>E. coli</i>	CFU/100 mL	150	e
W0093	SH01	9/28/2005	927	83-0632	83-0631	Total Nitrogen	mg/L	0.71	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	Fecal Coliforms	CFU/100 mL	100	e
W0093	SH01	9/28/2005	927	83-0632	83-0631	Total Phosphorus	mg/L	0.046	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	True Color	PCU	90	--
W0093	SH01	9/28/2005	927	83-0632	83-0631	Turbidity	NTU	7.4	--
W0185	SH03	9/28/2005	945	83-0634		<i>E. coli</i>	CFU/100 mL	97	--
W0185	SH03	9/28/2005	945	83-0634		Fecal Coliforms	CFU/100 mL	120	--
W0357	VB02A	9/28/2005	1005	83-0635		Ammonia-N	mg/L	0.07	--
W0357	VB02A	9/28/2005	1005	83-0635		Apparent color	PCU	95	e
W0357	VB02A	9/28/2005	1005	83-0635		<i>E. coli</i>	CFU/100 mL	39	--
W0357	VB02A	9/28/2005	1005	83-0635		Fecal Coliforms	CFU/100 mL	39	--
W0357	VB02A	9/28/2005	1005	83-0635		Total Nitrogen	mg/L	0.77	--
W0357	VB02A	9/28/2005	1005	83-0635		Total Phosphorus	mg/L	0.099	--
W0357	VB02A	9/28/2005	1005	83-0635		True Color	PCU	100	e
W0357	VB02A	9/28/2005	1005	83-0635		Turbidity	NTU	4.2	--
W1391	SB00	9/28/2005	1015	83-0636		<i>E. coli</i>	CFU/100 mL	1600	--
W1391	SB00	9/28/2005	1015	83-0636		Fecal Coliforms	CFU/100 mL	2000	--
W0091	SH06	9/28/2005	1045	83-0638		Ammonia-N	mg/L	0.05	--
W0091	SH06	9/28/2005	1045	83-0638		Apparent color	PCU	48	--
W0091	SH06	9/28/2005	1045	83-0638		<i>E. coli</i>	CFU/100 mL	720	--
W0091	SH06	9/28/2005	1045	83-0638		Fecal Coliforms	CFU/100 mL	810	--
W0091	SH06	9/28/2005	1045	83-0638		Hardness	mg/L	97	--
W0091	SH06	9/28/2005	1045	83-0638		Total Nitrogen	mg/L	0.65	--
W0091	SH06	9/28/2005	1045	83-0638		Total Phosphorus	mg/L	0.024	--
W0091	SH06	9/28/2005	1045	83-0638		True Color	PCU	27	--
W0091	SH06	9/28/2005	1045	83-0638		Turbidity	NTU	3.2	--
W0089	SH07	9/28/2005	1105	83-0639		<i>E. coli</i>	CFU/100 mL	140	--
W0089	SH07	9/28/2005	1105	83-0639		Fecal Coliforms	CFU/100 mL	190	--
W0750	CB01	9/28/2005	1120	83-0640		Ammonia-N	mg/L	0.05	--
W0750	CB01	9/28/2005	1120	83-0640		Apparent color	PCU	55	--
W0750	CB01	9/28/2005	1120	83-0640		<i>E. coli</i>	CFU/100 mL	250	e
W0750	CB01	9/28/2005	1120	83-0640		Fecal Coliforms	CFU/100 mL	200	e
W0750	CB01	9/28/2005	1120	83-0640		Hardness	mg/L	74	--
W0750	CB01	9/28/2005	1120	83-0640		Total Nitrogen	mg/L	2.1	--
W0750	CB01	9/28/2005	1120	83-0640		Total Phosphorus	mg/L	0.053	--
W0750	CB01	9/28/2005	1120	83-0640		True Color	PCU	15	--
W0750	CB01	9/28/2005	1120	83-0640		Turbidity	NTU	11.0	--
W0097	SW01	9/28/2005	1140	83-0641		Ammonia-N	mg/L	0.04	--
W0097	SW01	9/28/2005	1140	83-0641		Apparent color	PCU	60	--
W0097	SW01	9/28/2005	1140	83-0641		<i>E. coli</i>	CFU/100 mL	150	--
W0097	SW01	9/28/2005	1140	83-0641		Fecal Coliforms	CFU/100 mL	210	--
W0097	SW01	9/28/2005	1140	83-0641		Total Nitrogen	mg/L	0.58	--
W0097	SW01	9/28/2005	1140	83-0641		Total Phosphorus	mg/L	0.051	--
W0097	SW01	9/28/2005	1140	83-0641		True Color	PCU	49	--
W0097	SW01	9/28/2005	1140	83-0641		Turbidity	NTU	2.8	--

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Unique ID	Station ID	Date	Time	OWMID	Duplicate	Analyte	Units	Result*	Qualifier*
W1392	SR01	9/28/2005	1159	83-0642		Ammonia-N	mg/L	<0.02	--
W1392	SR01	9/28/2005	1159	83-0642		Apparent color	PCU	35	--
W1392	SR01	9/28/2005	1159	83-0642		<i>E. coli</i>	CFU/100 mL	190	e
W1392	SR01	9/28/2005	1159	83-0642		Fecal Coliforms	CFU/100 mL	170	e
W1392	SR01	9/28/2005	1159	83-0642		Hardness	mg/L	80	--
W1392	SR01	9/28/2005	1159	83-0642		Total Nitrogen	mg/L	1.0	--
W1392	SR01	9/28/2005	1159	83-0642		Total Phosphorus	mg/L	0.027	--
W1392	SR01	9/28/2005	1159	83-0642		True Color	PCU	25	--
W1392	SR01	9/28/2005	1159	83-0642		Turbidity	NTU	2.4	--
W1393	PB00	9/28/2005	1225	83-0643		Ammonia-N	mg/L	0.13	--
W1393	PB00	9/28/2005	1225	83-0643		Apparent color	PCU	50	--
W1393	PB00	9/28/2005	1225	83-0643		<i>E. coli</i>	CFU/100 mL	87	e
W1393	PB00	9/28/2005	1225	83-0643		Fecal Coliforms	CFU/100 mL	73	e
W1393	PB00	9/28/2005	1225	83-0643		Total Nitrogen	mg/L	2.4	a
W1393	PB00	9/28/2005	1225	83-0643		Total Phosphorus	mg/L	0.47	--
W1393	PB00	9/28/2005	1225	83-0643		True Color	PCU	25	--
W1393	PB00	9/28/2005	1225	83-0643		Turbidity	NTU	9.2	--
W0086	SH09	9/28/2005	1300	83-0644		Ammonia-N	mg/L	0.03	--
W0086	SH09	9/28/2005	1300	83-0644		Apparent color	PCU	40	--
W0086	SH09	9/28/2005	1300	83-0644		<i>E. coli</i>	CFU/100 mL	52	e
W0086	SH09	9/28/2005	1300	83-0644		Fecal Coliforms	CFU/100 mL	19	e
W0086	SH09	9/28/2005	1300	83-0644		Hardness	mg/L	77	--
W0086	SH09	9/28/2005	1300	83-0644		Total Nitrogen	mg/L	0.65	--
W0086	SH09	9/28/2005	1300	83-0644		Total Phosphorus	mg/L	0.021	--
W0086	SH09	9/28/2005	1300	83-0644		True Color	PCU	20	--
W0086	SH09	9/28/2005	1300	83-0644		Turbidity	NTU	2.6	--
W0989	RB01A	9/28/2005	1320	83-0645		Ammonia-N	mg/L	0.11	--
W0989	RB01A	9/28/2005	1320	83-0645		Apparent color	PCU	20	--
W0989	RB01A	9/28/2005	1320	83-0645		<i>E. coli</i>	CFU/100 mL	760	--
W0989	RB01A	9/28/2005	1320	83-0645		Fecal Coliforms	CFU/100 mL	980	--
W0989	RB01A	9/28/2005	1320	83-0645		Total Nitrogen	mg/L	1.3	--
W0989	RB01A	9/28/2005	1320	83-0645		Total Phosphorus	mg/L	0.029	--
W0989	RB01A	9/28/2005	1320	83-0645		True Color	PCU	20	--
W0989	RB01A	9/28/2005	1320	83-0645		Turbidity	NTU	<0.5	--
W0082	SH11A	9/28/2005	1345	83-0646		<i>E. coli</i>	CFU/100 mL	200	e
W0082	SH11A	9/28/2005	1345	83-0646		Fecal Coliforms	CFU/100 mL	160	e

*see Appendix 1 for a complete list of data symbols and qualifiers

Table 6. 2005 MassDEP Shawsheen River Watershed *E. coli* geometric means of samples

Unique ID	Station	Waterbody	Geomean (CFU/100 mL)
W0750	CB01	Content Brook	304
W0099	EB02	Elm Brook	1121
W1390	LMB00	Long Meadow Brook	1296
W1393	PB00	Unnamed Tributary	163
W0989	RB01A	Rogers Brook	434
W1391	SB00	Sandy Brook	680
W0093	SH01	Shawsheen River	258
W0185	SH03	Spring Brook	87
W0091	SH06	Shawsheen River	476
W0089	SH07	Shawsheen River	99
W0086	SH09	Shawsheen River	88
W0082	SH11A	Shawsheen River	488
W1392	SR01	Shawsheen River	156
W0097	SW01	Strong Water Brook	132
W0357	VB02A	Vine Brook	67

Table 7. 2005 MassDEP Shawsheen River Watershed *in-situ* attended multi-probe data

Station ID	Unique ID	Waterbody	Date	OWMID	Time	Sample Depth (m)	Temperature (deg. C)	Temperature Qualifiers*	pH (SU)	pH Qualifiers*	Specific Conductivity (uS/cm)	Specific Conductivity Qualifiers*	Total Dissolved Solids (mg/l)	Total Dissolved Solids Qualifiers*	Dissolved Oxygen (mg/l)	Dissolved Oxygen Qualifiers*	Saturation (%)	Saturation Qualifiers*
CB01	W0750	Content Brook	5/24/05	83-0464	11:52	0.5	9.8	--	6.8	--	382	--	248	--	9.1	--	80	--
CB01	W0750	Content Brook	6/21/05	83-0313	12:12	0.4	18.0	--	6.9	--	430	--	279	--	8.3	--	88	--
CB01	W0750	Content Brook	7/26/05	83-0340	12:24	0.3	23.2	--	7.1	--	471	--	306	--	6.9	--	81	--
CB01	W0750	Content Brook	8/23/05	83-0370	12:21	0.2	20.4	--	7.0	--	492	--	320	--	6.9	--	77	--
CB01	W0750	Content Brook	9/28/05	83-0624	11:26	0.2	13.0	--	6.9	--	477	--	305	--	7.9	--	75	--
EB02	W0099	Elm Brook	5/13/05	83-0303	9:53	0.2	10.1	--	6.5	--	479	--	307	--	9.7	u	86	u
EB02	W0099	Elm Brook	5/16/05	83-0306	9:46	0.2	10.5	--	6.4	--	471	--	302	--	8.6	i	78	i
EB02	W0099	Elm Brook	5/24/05	83-0460	9:08	0.4	9.8	--	6.2	--	380	--	247	--	9.2	--	81	--
EB02	W0099	Elm Brook	6/17/05	83-0381	9:09	0.1	12.8	--	6.3	--	454	--	291	--	7.5	--	73	--
EB02	W0099	Elm Brook	6/20/05	83-0382	8:30	**	12.4	--	6.4	--	512	--	328	--	8.5	--	80	--
EB02	W0099	Elm Brook	6/21/05	83-0309	9:39	0.1	14.9	--	6.4	--	540	--	351	--	8.2	--	81	--
EB02	W0099	Elm Brook	7/22/05	83-0488	8:59	**	19.6	--	--	--	--	--	--	--	6.6	i	73	i
EB02	W0099	Elm Brook	7/25/05	83-0489	9:11	0.3	18.8	--	6.4	--	668	--	427	--	7.6	i	83	i
EB02	W0099	Elm Brook	7/26/05	83-0336	9:39	0.1	19.6	--	6.7	--	684	--	445	--	6.8	--	74	--
EB02	W0099	Elm Brook	8/19/05	83-0519	9:16	0.1	16.7	--	6.6	--	689	--	441	--	6.9	--	72	--
EB02	W0099	Elm Brook	8/22/05	83-0520	8:40	0.1	19.0	--	6.6	--	702	--	450	--	6.3	--	69	--
EB02	W0099	Elm Brook	8/23/05	83-0366	9:27	0.3	17.5	--	6.4	--	727	u	473	u	##	u	##	u
EB02	W0099	Elm Brook	9/16/05	83-0436	9:02	0.1	19.6	--	6.4	m	470	m	301	m	5.4	m	60	m
EB02	W0099	Elm Brook	9/19/05	83-0437	9:15	**	15.9	--	6.5	--	679	--	435	--	7.1	--	73	--
EB02	W0099	Elm Brook	9/28/05	83-0620	9:07	0.2	12.5	--	6.4	--	692	--	443	--	7.1	--	68	--
PB00	W1393	Unnamed Tributary	5/24/05	83-0467	12:54	0.5	9.2	--	6.6	--	389	--	253	--	10.4	--	91	--
PB00	W1393	Unnamed Tributary	6/21/05	83-0316	13:24	0.1	21.3	--	6.8	--	716	--	465	--	8.1	--	92	--
PB00	W1393	Unnamed Tributary	7/26/05	83-0343	13:45	0.1	25.2	--	7.0	--	1200	--	781	--	6.8	--	83	--
PB00	W1393	Unnamed Tributary	8/23/05	83-0373	14:06	0.1	21.1	--	6.9	--	665	--	432	--	8.0	--	90	--
PB00	W1393	Unnamed Tributary	9/28/05	83-0627	12:30	0.2	13.2	--	6.4	--	1200	--	771	--	5.1	--	49	--
RB01A	W0989	Rogers Brook	5/24/05	83-0486	13:30	0.2	9.8	--	6.7	--	389	--	253	--	11.8	--	104	--
RB01A	W0989	Rogers Brook	6/17/05	83-0402	12:59	0.2	14.7	--	6.8	--	496	--	318	--	9.6	--	97	--
RB01A	W0989	Rogers Brook	6/20/05	83-0403	11:21	0.1	14.7	--	6.8	--	524	--	335	--	9.6	--	95	--
RB01A	W0989	Rogers Brook	6/21/05	83-0318	14:21	0.1	17.7	--	6.7	--	547	--	356	--	9.4	--	99	--
RB01A	W0989	Rogers Brook	7/22/05	83-0509	12:40	**	20.9	--	--	--	--	--	--	--	7.2	u,i	82	u,i
RB01A	W0989	Rogers Brook	7/25/05	83-0510	13:45	0.1	19.3	--	7.0	--	836	--	535	--	8.6	i	96	i

Table 7(continued). 2005 MassDEP Shawsheen River Watershed *in-situ* attended multi-probe data

Station ID	Unique ID	Waterbody	Date	OWMID	Time	Sample Depth (m)	Temperature (deg. C)	Temperature Qualifiers*	pH (SU)	pH Qualifiers*	Specific Conductivity (uS/cm)	Specific Conductivity Qualifiers*	Total Dissolved Solids (mg/l)	Total Dissolved Solids Qualifiers*	Dissolved Oxygen (mg/l)	Dissolved Oxygen Qualifiers*	Saturation (%)	Saturation Qualifiers*
RB01A	W0989	Rogers Brook	7/26/05	83-0345	14:43	0.1	20.3	--	6.9	--	824	--	536	--	8.4	--	93	--
RB01A	W0989	Rogers Brook	8/19/05	83-0540	12:18	0.1	17.9	--	7.0	--	994	--	636	--	8.1	--	86	--
RB01A	W0989	Rogers Brook	8/22/05	83-0541	12:44	0.1	19.1	u	6.9	--	1020	--	654	--	6.9	--	77	--
RB01A	W0989	Rogers Brook	8/23/05	83-0375	14:53	0.1	18.3	--	7.1	--	915	--	595	--	9.0	--	96	--
RB01A	W0989	Rogers Brook	9/16/05	83-0457	13:03	0.1	18.3	--	6.9	m	892	m	571	m	6.9	m	74	m
RB01A	W0989	Rogers Brook	9/19/05	83-0458	12:34	0.1	17.5	--	6.8	--	803	--	514	--	8.5	--	90	--
RB01A	W0989	Rogers Brook	9/28/05	83-0629	13:24	0.2	14.9	--	7.0	--	1080	--	690	--	8.6	--	86	--
SH01	W0093	Shawsheen River	5/13/05	83-0304	10:56	0.2	12.6	--	6.6	--	907	--	581	--	6.7	--	63	--
SH01	W0093	Shawsheen River	5/16/05	83-0307	10:13	0.2	11.9	--	6.6	--	920	--	589	--	6.5	i	61	i
SH01	W0093	Shawsheen River	5/24/05	83-0461	9:34	0.3	10.4	--	6.4	--	580	--	377	--	8.1	--	73	--
SH01	W0093	Shawsheen River	6/17/05	83-0384	9:37	0.2	14.7	--	6.5	--	807	--	517	--	4.9	--	50	--
SH01	W0093	Shawsheen River	6/20/05	83-0385	8:52	0.1	14.5	--	6.5	--	870	--	557	--	5.2	u	52	u
SH01	W0093	Shawsheen River	6/21/05	83-0310	10:09	0.2	16.5	--	6.5	--	589	--	383	--	5.1	--	52	--
SH01	W0093	Shawsheen River	7/22/05	83-0491	9:22	**	21.0	--	--	--	--	--	--	--	4.4	i	50	i
SH01	W0093	Shawsheen River	7/25/05	83-0492	9:32	0.2	19.9	--	6.6	--	868	--	555	--	5.6	i	63	i
SH01	W0093	Shawsheen River	7/26/05	83-0337	10:02	0.1	19.9	--	6.8	--	832	--	541	--	5.5	--	60	--
SH01	W0093	Shawsheen River	8/19/05	83-0522	9:38	0.1	18.5	--	6.7	--	803	--	514	--	4.6	--	49	--
SH01	W0093	Shawsheen River	8/22/05	83-0523	9:02	**	20.3	--	6.6	--	706	--	452	--	3.4	--	39	--
SH01	W0093	Shawsheen River	8/23/05	83-0367	10:01	0.3	19.1	--	6.7	--	786	--	511	--	4.8	--	52	--
SH01	W0093	Shawsheen River	9/16/05	83-0439	9:31	0.1	20.9	--	6.5	m	535	m	342	m	3.3	m	38	m
SH01	W0093	Shawsheen River	9/19/05	83-0440	9:45	**	17.6	--	6.6	--	776	--	497	--	4.7	--	50	--
SH01	W0093	Shawsheen River	9/28/05	83-0621	9:32	0.2	14.4	--	6.6	--	687	--	440	--	4.4	--	44	--
SH06	W0091	Shawsheen River	5/24/05	83-0463	11:15	0.2	10.1	--	6.6	--	522	--	339	--	8.1	--	72	--
SH06	W0091	Shawsheen River	6/17/05	83-0390	10:55	0.9	14.6	--	6.8	--	654	--	418	--	6.3	--	64	--
SH06	W0091	Shawsheen River	6/20/05	83-0391	9:47	0.7	15.3	--	6.7	--	656	--	420	--	6.1	--	61	--
SH06	W0091	Shawsheen River	6/21/05	83-0312	11:32	0.8	18.3	--	6.8	--	664	--	431	--	7.5	--	80	--
SH06	W0091	Shawsheen River	7/22/05	83-0497	10:38	**	24.9	--	--	--	--	--	--	--	2.1	i	26	i
SH06	W0091	Shawsheen River	7/25/05	83-0498	10:24	0.2	23.2	--	6.6	--	745	--	477	--	3.5	i	42	i
SH06	W0091	Shawsheen River	7/26/05	83-0339	11:34	0.8	24.1	--	6.8	--	742	--	482	--	4.6	--	55	--
SH06	W0091	Shawsheen River	8/19/05	83-0528	10:34	0.7	20.9	--	6.8	--	679	--	434	--	3.9	--	44	--
SH06	W0091	Shawsheen River	8/22/05	83-0529	9:51	0.6	22.2	--	6.7	--	719	--	460	--	2.7	--	32	--

Station ID	Unique ID	Waterbody	Date	OWMID	Time	Sample Depth (m)	Temperature (deg. C)	Temperature Qualifiers*	pH (SU)	pH Qualifiers*	Specific Conductivity (uS/cm)	Specific Conductivity Qualifiers*	Total Dissolved Solids (mg/l)	Total Dissolved Solids Qualifiers*	Dissolved Oxygen (mg/l)	Dissolved Oxygen Qualifiers*	Saturation (%)	Saturation Qualifiers*
SH06	W0091	Shawsheen River	8/23/05	83-0369	11:38	0.4	21.9	--	6.7	--	737	--	479	--	4.8	--	55	--
SH06	W0091	Shawsheen River	9/16/05	83-0445	10:43	0.5	20.9	--	6.7	m	675	m	432	m	3.0	m	34	m
SH06	W0091	Shawsheen River	9/19/05	83-0446	10:42	0.1	18.6	--	6.6	--	606	--	388	--	4.2	--	45	--
SH06	W0091	Shawsheen River	9/28/05	83-0623	10:50	0.5	16.0	--	6.8	--	770	--	493	--	6.0	--	61	--
SH09	W0086	Shawsheen River	5/24/05	83-0468	13:50	0.2	10.9	--	7.0	--	471	--	306	--	11.0	--	100	--
SH09	W0086	Shawsheen River	6/17/05	83-0399	12:26	0.2	15.4	--	7.1	--	491	--	314	--	9.0	--	92	--
SH09	W0086	Shawsheen River	6/20/05	83-0400	11:00	0.1	16.5	--	7.1	--	500	--	320	--	9.2	--	95	--
SH09	W0086	Shawsheen River	6/21/05	83-0317	13:52	0.3	19.8	--	7.1	--	514	--	334	--	9.5	--	104	--
SH09	W0086	Shawsheen River	7/22/05	83-0506	12:16	**	25.9	--	--	--	--	--	--	--	6.6	i	82	i
SH09	W0086	Shawsheen River	7/25/05	83-0507	13:23	0.1	23.9	--	7.2	--	559	--	358	--	7.9	i	95	i
SH09	W0086	Shawsheen River	7/26/05	83-0344	14:20	0.3	25.5	--	7.2	--	549	--	357	--	7.9	--	97	--
SH09	W0086	Shawsheen River	8/19/05	83-0537	11:52	**	21.8	--	7.1	--	561	--	359	--	6.8	--	78	--
SH09	W0086	Shawsheen River	8/22/05	83-0538	12:25	0.1	23.1	--	6.9	--	541	--	346	--	6.1	--	72	--
SH09	W0086	Shawsheen River	8/23/05	83-0374	14:31	0.2	23.3	--	7.1	--	548	--	356	--	7.5	--	89	--
SH09	W0086	Shawsheen River	9/16/05	83-0454	12:32	0.3	21.5	--	6.8	m	536	m	343	m	4.5	m	51	m
SH09	W0086	Shawsheen River	9/19/05	83-0455	12:02	0.1	19.8	--	6.8	--	552	--	353	--	6.4	--	71	--
SH09	W0086	Shawsheen River	9/28/05	83-0628	13:04	0.2	16.8	--	6.9	--	532	--	341	--	6.7	--	69	--
SR01	W1392	Shawsheen River	5/24/05	83-0466	12:30	0.7	10.3	--	6.8	--	482	--	313	--	9.0	--	80	--
SR01	W1392	Shawsheen River	6/17/05	83-0396	11:53	0.2	14.9	--	6.8	--	503	--	322	--	7.3	--	75	--
SR01	W1392	Shawsheen River	6/20/05	83-0397	10:35	0.2	15.7	--	6.8	--	527	--	338	--	7.6	--	77	--
SR01	W1392	Shawsheen River	6/21/05	83-0315	12:58	0.3	19.5	--	6.9	--	530	--	345	--	8.3	--	90	--
SR01	W1392	Shawsheen River	7/22/05	83-0503	11:38	**	24.7	--	--	--	--	--	--	--	6.3	i	77	i
SR01	W1392	Shawsheen River	7/25/05	83-0504	12:54	0.2	22.7	--	7.1	--	579	--	370	--	7.1	i	84	i
SR01	W1392	Shawsheen River	7/26/05	83-0342	13:17	0.4	24.9	--	7.1	--	561	--	365	--	7.9	--	96	--
SR01	W1392	Shawsheen River	8/19/05	83-0534	11:19	0.2	20.5	--	7.0	--	548	--	351	--	6.4	--	72	--
SR01	W1392	Shawsheen River	8/22/05	83-0535	11:57	0.2	22.8	--	7.0	--	557	--	356	--	5.9	--	70	--
SR01	W1392	Shawsheen River	8/23/05	83-0372	13:32	0.3	23.2	--	7.1	--	589	--	383	--	8.3	--	97	--
SR01	W1392	Shawsheen River	9/16/05	83-0451	11:43	0.1	21.0	--	6.8	m	577	m	369	m	5.1	m	58	m
SR01	W1392	Shawsheen River	9/19/05	83-0452	11:31	0.1	18.9	--	6.8	--	564	--	361	--	6.5	--	71	--
SR01	W1392	Shawsheen River	9/28/05	83-0626	12:05	0.4	16.0	--	6.9	--	567	--	363	--	7.5	--	76	--
SW01	W0097	Strong Water Brook	5/24/05	83-0465	12:13	0.3	10.0	--	6.6	--	437	--	284	--	8.4	--	75	--
SW01	W0097	Strong Water Brook	6/17/05	83-0393	11:32	0.2	14.7	--	6.7	--	465	--	298	--	5.7	--	58	--
SW01	W0097	Strong Water Brook	6/20/05	83-0394	10:17	0.1	15.2	--	6.7	--	475	--	304	--	6.2	--	62	--
SW01	W0097	Strong Water Brook	6/21/05	83-0314	12:35	0.2	19.2	--	6.6	--	478	--	310	--	6.4	--	69	--

Table 7 (continued). 2005 MassDEP Shawsheen River Watershed *in-situ* attended multi-probe data

Station ID	Unique ID	Waterbody	Date	OWMID	Time	Sample Depth (m)	Temperature (deg. C)	Temperature Qualifiers*	pH (SU)	pH Qualifiers*	Specific Conductivity (uS/cm)	Specific Conductivity Qualifiers*	Total Dissolved Solids (mg/l)	Total Dissolved Solids Qualifiers*	Dissolved Oxygen (mg/l)	Dissolved Oxygen Qualifiers*	Saturation (%)	Saturation Qualifiers*
SW01	W0097	Strong Water Brook	7/22/05	83-0500	11:19	**	24.6	--	--	--	--	--	--	--	4.4	i	53	i
SW01	W0097	Strong Water Brook	7/25/05	83-0501	12:37	0.2	22.4	--	6.8	--	501	--	320	--	5.9	i	69	i
SW01	W0097	Strong Water Brook	7/26/05	83-0341	12:52	0.1	24.6	--	6.8	--	399	--	259	--	4.9	--	59	--
SW01	W0097	Strong Water Brook	8/19/05	83-0531	11:00	0.1	20.9	--	6.9	--	525	--	336	--	5.3	--	60	--
SW01	W0097	Strong Water Brook	8/22/05	83-0532	11:41	0.1	23.4	--	7.0	--	522	--	334	--	5.0	--	60	--
SW01	W0097	Strong Water Brook	8/23/05	83-0371	13:12	0.1	22.7	--	6.9	--	448	--	291	--	5.4	--	62	--
SW01	W0097	Strong Water Brook	9/16/05	83-0448	11:20	0.1	20.7	--	7.0	m	520	m	333	m	4.4	m	49	m
SW01	W0097	Strong Water Brook	9/19/05	83-0449	11:12	0.1	19.3	--	6.9	--	534	--	342	--	5.6	--	61	--
SW01	W0097	Strong Water Brook	9/28/05	83-0625	11:48	0.1	15.7	--	6.9	--	539	--	345	--	6.0	--	61	--
VB02A	W0357	Vine Brook	5/13/05	83-0305	12:00	0.4	14.2	--	6.9	--	611	--	391	--	6.5	u	64	u
VB02A	W0357	Vine Brook	5/16/05	83-0308	10:46	0.6	12.0	--	6.7	--	645	--	413	--	5.2	i	49	i
VB02A	W0357	Vine Brook	5/24/05	83-0462	10:21	0.8	10.0	--	6.6	--	511	--	332	--	6.3	u	56	u
VB02A	W0357	Vine Brook	6/17/05	83-0387	10:13	0.6	14.8	--	6.6	--	596	--	381	--	3.4	--	35	--
VB02A	W0357	Vine Brook	6/20/05	83-0388	9:18	0.5	14.4	--	6.5	--	564	--	361	--	2.8	--	28	--
VB02A	W0357	Vine Brook	6/21/05	83-0311	10:45	0.4	17.3	--	6.5	--	559	--	363	--	3.2	--	34	--
VB02A	W0357	Vine Brook	7/22/05	83-0494	10:06	**	21.8	u	--	--	--	--	--	--	<0.2	i	<2	i
VB02A	W0357	Vine Brook	7/25/05	83-0495	9:58	0.3	20.3	--	6.5	--	660	--	422	--	0.4	i	4	i
VB02A	W0357	Vine Brook	7/26/05	83-0338	10:39	0.1	22.1	u	6.5	--	670	--	435	--	0.5	--	5	--
VB02A	W0357	Vine Brook	8/19/05	83-0525	10:08	0.3	18.0	--	6.5	--	549	--	351	--	0.8	--	9	--
VB02A	W0357	Vine Brook	8/22/05	83-0526	9:26	0.7	20.3	--	6.6	--	589	--	377	--	<0.2	--	<2	--
VB02A	W0357	Vine Brook	8/23/05	83-0368	10:50	0.6	19.2	--	6.6	--	585	--	380	--	0.3	--	3	--
VB02A	W0357	Vine Brook	9/16/05	83-0442	10:09	0.4	20.3	--	6.4	m	449	m	288	m	0.3	m	4	m
VB02A	W0357	Vine Brook	9/19/05	83-0443	10:16	0.6	17.1	--	6.2	--	668	--	427	--	0.4	--	4	--
VB02A	W0357	Vine Brook	9/28/05	83-0622	10:11	0.4	14.6	--	6.6	--	616	--	394	--	2.6	--	26	--

*see Appendix 1 for a complete list of data symbols and qualifiers

Table 8. 2005 MassDEP Shawsheen River Watershed summary of unattended probe data

For purposes of summarizing the unattended probe data in this technical memorandum, selected statistics for each station and dates of visit are shown. While the data used to calculate the statistics may have been qualified for various reasons (representativeness, inaccuracy, method not followed, etc.), these data are generally considered acceptable for statistical purposes. Censored data were not used in these calculations. For more detailed information about qualified data points for a given station visit, refer to the final data files that have undergone quality assurance/quality control review (available from MassDEP upon request).

Deploy Information					Temperature					Dissolved Oxygen							
Station ID	Unique ID	Water Body	Start Date	Deployment Duration (Hours)	Average (deg. C)	Maximum (deg. C)	Mean of the Daily Maximum (deg. C)	Amount of Time > 20 deg. C (Hours)	Percentage of Time > 20 deg. C	Average (mg/L)	Minimum (mg/L)	Average Daily Amount of Time < 3.0 mg/L (Hours)	Average Daily Amount of Time < 5.0 mg/L (Hours)	Average Daily Amount of Time < 6.0 mg/L (Hours)	Average Saturation (%)	Minimum Saturation (%)	Maximum Saturation (%)
EB02	W0099	Elm Brook	5/13/2005	71.5	12.4	15.8	13.9	0.0	0.0	8.5	7.7	0.0	0.0	0.0	80	69	99
EB02	W0099	Elm Brook	6/17/2005	71.0	14.5	15.9	15.7	0.0	0.0	7.3	6.9	0.0	0.0	0.0	74	72	76
EB02	W0099	Elm Brook	7/22/2005	72.0	19.7	22.3	20.5	28.9	40.1	6.6	6.0	0.0	0.0	0.0	74	70	77
EB02	W0099	Elm Brook	8/19/2005	71.0	19.4	21.9	21.1	22.0	31.0	6.8	5.9	0.0	0.0	2.6	74	67	79
EB02	W0099	Elm Brook	9/16/2005	71.5	18.2	19.5	18.7	0.0	0.0	6.3	5.9	0.0	0.0	0.0	68	64	71
RB01A	W0989	Rogers Brook	6/17/2005	70.0	14.8	16.9	15.6	0.0	0.0	9.4	8.9	0.0	0.0	0.0	95	94	97
RB01A	W0989	Rogers Brook	7/22/2005	72.5	19.3	21.1	19.8	21.2	29.3	8.2	7.9	0.0	0.0	0.0	90	88	92
RB01A	W0989	Rogers Brook	8/19/2005	72.0	17.9	19.5	18.8	0.0	0.0	8.3	7.9	0.0	0.0	0.0	88	85	92
RB01A	W0989	Rogers Brook	9/16/2005	71.0	18.0	19.5	18.7	0.0	0.0	8.0	7.5	0.0	0.0	0.0	85	80	96
SH01	W0093	Shawsheen River	5/13/2005	71.0	13.9	16.0	14.6	0.0	0.0	7.3	6.4	0.0	0.0	0.0	70	60	84
SH01	W0093	Shawsheen River	6/17/2005	70.5	16.3	17.9	17.4	0.0	0.0	5.1	4.6	0.0	12.1	24.0	54	48	62
SH01	W0093	Shawsheen River	7/22/2005	72.0	21.2	23.5	22.6	55.0	76.4	5.3	4.6	0.0	4.3	24.0	60	53	66
SH01	W0093	Shawsheen River	8/19/2005	71.0	20.5	22.6	22.1	51.4	72.3	5.0	3.8	0.0	11.0	24.0	56	42	70
SH01	W0093	Shawsheen River	9/16/2005	71.5	19.5	20.9	20.1	16.8	23.4	4.3	3.7	0.0	24.0	24.0	47	41	54
SH06	W0091	Shawsheen River	6/17/2005	44.5	16.9	18.2	18.2	0.0	0.0	6.0	3.9	0.0	10.2	16.1	64	41	86
SH06	W0091	Shawsheen River	7/22/2005	71.0	25.0	27.3	26.4	71.0	100.0	4.3	1.2	10.5	14.1	16.1	53	15	109
SH06	W0091	Shawsheen River	8/19/2005	70.5	22.6	25.0	24.2	70.5	100.0	6.3	3.3	0.0	7.6	11.2	73	39	110
SH06	W0091	Shawsheen River	9/16/2005	71.5	20.2	21.5	21.2	43.7	61.1	4.0	2.8	2.9	19.9	24.0	45	31	65

Table 8 (continued). 2005 MassDEP Shawsheen River Watershed summary of unattended probe data

Deploy Information					Temperature					Dissolved Oxygen							
Station ID	Unique ID	Water Body	Start Date	Deployment Duration (Hours)	Average (deg. C)	Maximum (deg. C)	Mean of the Daily Maximum (deg. C)	Amount of Time > 20 deg. C (Hours)	Percentage of Time > 20 deg. C	Average (mg/L)	Minimum (mg/L)	Average Daily Amount of Time < 3.0 mg/L (Hours)	Average Daily Amount of Time < 5.0 mg/L (Hours)	Average Daily Amount of Time < 6.0 mg/L (Hours)	Average Saturation (%)	Minimum Saturation (%)	Maximum Saturation (%)
SH09	W0086	Shawsheen River	6/17/2005	70.5	16.6	17.5	17.4	0.0	0.0	8.3	7.9	0.0	0.0	0.0	87	83	95
SH09	W0086	Shawsheen River	7/22/2005	72.5	25.1	27.3	26.3	72.5	100.0	6.5	5.2	0.0	0.0	10.5	81	64	103
SH09	W0086	Shawsheen River	8/19/2005	72.0	22.4	23.8	23.1	72.0	100.0	6.9	5.1	0.0	0.0	5.4	81	60	102
SH09	W0086	Shawsheen River	9/16/2005	71.0	20.4	21.6	21.0	57.4	80.8	6.3	5.1	0.0	0.0	6.2	70	59	83
SR01	W1392	Shawsheen River	6/17/2005	70.5	16.4	17.6	17.3	0.0	0.0	7.4	6.5	0.0	0.0	0.0	78	67	87
SR01	W1392	Shawsheen River	7/22/2005	72.5	24.5	27.2	25.9	72.5	100.0	6.7	5.1	0.0	0.0	8.9	82	62	103
SR01	W1392	Shawsheen River	8/19/2005	69.0	22.2	23.9	23.2	69.0	100.0	7.2	6.0	0.0	0.0	0.0	83	69	99
SR01	W1392	Shawsheen River	9/16/2005	71.5	20.0	21.1	20.5	40.1	56.1	6.7	5.9	0.0	0.0	0.3	75	66	81
SW01	W0097	Strong Water Brook	6/17/2005	70.0	16.5	18.3	17.6	0.0	0.0	6.2	4.8	0.0	2.5	11.5	66	50	85
SW01	W0097	Strong Water Brook	7/22/2005	73.0	24.0	27.3	25.9	73.0	100.0	4.6	3.8	0.0	16.4	24.0	56	46	69
SW01	W0097	Strong Water Brook	8/19/2005	72.0	22.0	24.4	23.4	72.0	100.0	5.3	4.8	0.0	6.7	24.0	61	54	70
SW01	W0097	Strong Water Brook	9/16/2005	71.5	19.8	21.1	20.5	30.2	42.2	5.4	5.1	0.0	0.0	24.0	59	55	67
VB02A	W0357	Vine Brook	5/13/2005	70.0	14.0	17.4	15.7	0.0	0.0	5.3	3.4	0.0	12.1	15.7	52	32	79
VB02A	W0357	Vine Brook	6/17/2005	70.5	16.1	17.6	17.0	0.0	0.0	2.9	2.2	16.8	24.0	24.0	30	23	44
VB02A	W0357	Vine Brook	7/22/2005	71.0	21.5	23.3	22.4	61.2	86.2	0.2	0.2	24.0	24.0	24.0	2	2	4
VB02A	W0357	Vine Brook	8/19/2005	70.5	19.8	21.0	20.6	39.1	55.5	0.3	0.2	24.0	24.0	24.0	4	2	11
VB02A	W0357	Vine Brook	9/16/2005	71.5	19.1	20.4	19.4	8.2	11.4	0.4	0.2	24.0	24.0	24.0	5	2	8

Table 9. 2005 MassDEP Shawsheen River Watershed continuous temperature deploy data

For purposes of summarizing the continuous temperature data in this technical memorandum, selected statistics for each station and dates of visit are shown. While the data used to calculate the statistics may have been qualified for various reasons (representativeness, inaccuracy, method not followed, etc.), these data are generally considered acceptable for statistical purposes. Censored data were not used in these calculations. For more detailed information about qualified data points for a given station visit, refer to the final data files that have undergone quality assurance/quality control review (available from MassDEP upon request).

Unique ID	Station ID	Water Body	OWMID	Start Date	End Date	Total Deployment (Hours)	Average (deg. C)	Standard Deviation	Min (deg. C)	Max (deg. C)	Range of 7-Day Average of the Daily Max (deg. C)	Maximum Weekly Average Temperature (deg. C)	Average Daily Amount of Time > 20 deg. C (Hours)	Average Daily Amount of Time > 28.3 deg. C (Hours)
W0099	EB02	Elm Brook	83-0363	8/09/2005	9/13/2005	840.8	19.2	2.2	12.9	24.7	18.3-22.9	21.3	8.7	0.0
W0096	RB02	Rogers Brook	83-0364	8/09/2005	9/13/2005	839.8	19.2	2.3	12.1	24.2	19.8-22.7	21.5	9.3	0.0
W0989	RB01A	Rogers Brook	83-0365	8/09/2005	9/13/2005	840.0	17.8	1.6	13.0	24.0	18.5-21.3	19.4	1.7	0.0

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Appendix 1: 2005 Data Symbols and Qualifiers

The following data qualifiers or symbols are used in the MADEP/DWM WQD database for qualified and censored water quality and multi-probe data. Decisions regarding censoring vs. qualification for specific, problematic data are made based on a thorough review of all pertinent information related to the data.

General Symbols (applicable to all types):

“ ## ” = Censored data (i.e., data that has been discarded for some reason).

“ ** ” = Missing data (i.e., data that should have been reported).

“ -- ” = No data (i.e., data not taken/not required)

* = Analysis performed by Laboratory OTHER than DEP's Wall Experiment Station (WES)

[] = A result reported inside brackets has been “censored”, but is shown for informational purposes (e.g., high blank results).

Multi-probe-specific Qualifiers:

“ i ” = inaccurate readings from Multi-probe likely; may be due to significant pre-survey calibration problems, post-survey checks outside typical acceptance ranges for the low ionic and deionized water checks, lack of calibration of the depth sensor prior to use, or to checks against laboratory analyses. Where documentation on unit pre-calibration is lacking, but SOPs at the time of sampling dictated pre-calibration prior to use, then data are considered potentially inaccurate.

“ m ” = method not followed; one or more protocols contained in the DWM Multi-probe SOP not followed, i.e., operator error (e.g., less than 3 readings per station (rivers) or per depth (lakes), or instrument failure not allowing method to be implemented.

“ s ” = field sheet recorded data were used to accept data, not data electronically recorded in the Multi-probe surveyor unit, due to operator error or equipment failure.

“ u ” = unstable readings, due to lack of sufficient equilibration time prior to final readings, non-representative location, highly-variable water quality conditions, etc. See Section 4.1 for acceptance criteria.

“ c ” = greater than calibration standard used for pre-calibration, or outside the acceptable range about the calibration standard. Typically used for conductivity (>718, 1,413, 2,760, 6,668 or 12,900 uS/cm) or turbidity (>10, 20 or 40 NTU). It can also be used for TDS and Salinity calculations based on qualified (“c”) conductivity data, or that the calculation was not possible due to censored conductivity data (TDS and Salinity are calculated values and entirely based on conductivity reading). See Section 4.1 for acceptance criteria.

“ r ” = data not representative of actual field conditions.

“ t ” = tidal conditions

Sample-Specific Qualifiers:

“ a ” = accuracy as estimated at WES Lab via matrix spikes, PT sample recoveries, internal check standards and lab-fortified blanks did not meet project data quality objectives identified for program or in QAPP.

“ b ” = blank Contamination in lab reagent blanks and/or field blank samples (indicating possible bias high and false positives).

“ d ” = precision of field duplicates (as RPD) did not meet project data quality objectives identified for program or in QAPP. Batched samples may also be affected.

“ e ” = not theoretically possible. Specifically, used for bacteria data where colonies per unit volume for e-coli bacteria > fecal coliform bacteria, for lake Secchi and station depth data where a specific Secchi depth is greater than the reported station depth, and for other incongruous or conflicting results.

“ f ” = frequency of quality control duplicates did not meet data quality objectives identified for program or in QAPP.

“ h ” = holding time violation (usually indicating possible bias low)

“ j ” = ‘estimated’ value; used for lab-related issues where certain lab QC criteria are not met and re-testing is not possible (as identified by the WES lab only). Also used to report sample data where the sample concentration is less than the ‘reporting’ limit or RDL and greater than the method detection limit or MDL ($mdl < x < rdl$). Also used to note where values have been reported at levels less than the mdl.

“ m ” = method SOP not followed, only partially implemented or not implemented at all, due to complications with sample matrix (e.g., sediment in sample, floc formation), lab error (e.g., cross-contamination between samples), additional steps taken by the lab to deal with matrix complications, lost/unanalyzed samples, and missing data.

“ p ” = samples not preserved per SOP or analytical method requirements.

“ r ” = samples collected may not be representative of actual field conditions, including the possibility of “outlier” data and flow-limited conditions (e.g., pooled).

“ t ” = tidal conditions